UNIVERSIDADE DE LISBOA

FACULDADE DE PSICOLOGIA

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(Secção de Cognição Social Aplicada)

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Abstract

When we think of what makes us human, our complex reasoning skills and secondary emotions (e.g., pride, shame) probably come to mind, which is largely supported by the scientific literature. Children are yet to develop many of those uniquely human characteristics. Does this mean that they are not perceived as fully human (i.e., infrahumanized)? We tested this infrahumanization of children hypothesis using three different paradigms. In Study 1, participants categorized human and chimpanzee faces, of both juvenile and adult individuals, by quickly clicking on the appropriate label "person" or "chimpanzee", while mouse-tracking software recorded their mouse pointer trajectories. Contrary to our predictions, trajectories for human children faces were actually straighter (i.e., more direct to the "person" label) than for adults faces, while the opposite was true for chimpanzee faces, $F(1,44) = 9.92$, $p = .003$. Participants in Study 2 assigned words from a list to adult and child targets. The list contained both positive and negative human- and animal-related words. If participants infrahumanized children in this task, more human-related words should be assigned to adults than to children. Results showed a tendency to assign more typically human words to adults than to children, $F(1,59) = 3.28$, $p = .075$. In Study 3, participants rated a list of 61 words (positive and negative, typically human and typically animal words) as to how adult- or child-related they considered them to be. Results from this study showed that the more typically-animal a word was, the more it was perceived to be related to children, $r(58) = .74$, $p < .001$. I discuss the implications of these (inconsistent) results for the infrahumanization of children hypothesis, as well as propose follow-up studies to overcome each study's limitations, in an attempt to better answer the guiding question.

Keywords: Infrahumanization, Children, Dehumanization, Animalistic, Mouse-tracking

Resumo

Quando pensamos naquilo que nos torna verdadeiramente humanos, pensamos em características como capacidades intelectuais superiores (e.g., linguagem, raciocínio lógico) e/ou emoções secundárias (e.g., vergonha, orgulho), algo que literatura tem vindo a suportar. De facto, a literatura sobre infrahumanização tem revelado que atribuímos mais emoções secundárias ao nosso endogrupo do que a alguns dos nossos exogrupos. Ou seja, consideramos que tanto as pessoas do nosso endogrupo como as do exogrupo sentem emoções como o medo ou a alegria (emoções primárias que partilhamos com os restantes animais), mas que é mais provável as pessoas do endogrupo sentirem emoções complexas e de cariz mais social, como o orgulho ou a vergonha, do as pessoas de um exogrupo (Leyens et al., 2000). A investigação em psicologia revela ainda que este efeito é dissociável de discriminação, porque não diz respeito a percecionarmos os exogrupos negativamente (e.g., não se trata de atribuirmos mais emoções negativas ao exogrupo), mas sim percecionarmo-los como não sendo totalmente humanos. Sendo que as crianças ainda não possuem, ou possuem de forma incipiente, algumas destas capacidades e competências que percebemos como unicamente humanas, , será que acabamos por considerá-las menos humanas do que os adultos? Ou seja, como sugere o título do presente trabalho, será que infrahumanizamos as nossas crianças? Se as crianças forem infrahumanizadas, as decisões que os adultos (dos quais elas dependem) tomam sobre elas podem estar a ser enviesadas por este fenómeno. Ao mesmo tempo, a literatura da infrahumanização refere que mesmo grupos sociais que são percecionados como positivos podem ainda assim ser infrahumanizados. Contudo, na literatura, as evidências de grupos percecionados positivamente que sejam infrahumanizados são bastante escassas, quiçá inexistentes. Intuitivamente, podemos

considerar que as crianças são uma categoria social que percecionamos positivamente. Neste sentido, se forem encontradas evidências da infrahumanização de crianças, terá ao mesmo tempo sido descoberta uma das raras categorias sociais que, mesmo sendo percecionada positivamente, é infrahumanizada. A hipótese de que as crianças são vistas como menos humanas do que os adultos foi testada em três estudos com metodologias diversas e que produziram resultados, também eles diversos. No Estudo 1, foi pedido aos participantes que categorizassem rapidamente faces de chimpanzés e humanos,de indivíduos adultos e de juvenis, como "pessoa" ou "chimpanzé", enquanto *software* de *mouse-tracking* registava (sem que os participantes soubessem) as trajetórias dos seus ponteiros do rato. Os resultados indicam que, ao contrário do previsto, os participantes associaram mais diretamente as faces de crianças humanas ao rótulo "pessoa" do que associaram as fotografias de adultos humanos, tendo-se encontrado o padrão inverso para as faces de chimpanzés, $F(1,44) = 9.92$, $p = .003$. A tarefa realizada pelos participantes no segundo estudo consistia em atribuir uma, e uma só, palavra de uma lista de 24, a um conjunto de dez fotografias de crianças e fazer o mesmo para um conjunto de dez fotografias de adultos. A lista de 24 palavras continha palavras tipicamente associadas a seres humanos e palavras tipicamente associadas. Metade das palavras eram positivas e a outra metade negativas. Se os participantes deste estudo, infrahumanizassem as crianças, atribuir-lhes-iam um menor número de palavras tipicamente humanas do que aquele que atribuiriam a adultos. Os resultados deste estudo mostram uma tendência dos participantes para atribuírem mais palavras tipicamente humanas a adultos do que a crianças. Os participantes do Estudo 3, classificaram uma lista de 61 palavras (tipicamente humanas, tipicamente animais, tanto positivas como negativas), usando uma escala de 7 pontos, relativamente a quão

relacionadas com crianças ou adultos consideravam que cada palavra era. A previsão de que palavras percebidas como típicas de animal, seriam também percebidas como mais relacionadas com crianças verificou-se, $r(58) = .74$, $p < .001$. Para além disso, os resultados indicam que quanto mais relacionada com crianças uma palavra é considerada, mais ela é percebida como sendo positiva, $r(59) = -.33$, $p = .010$. Resumidamente, os resultados destes três estudos revelam que o Estudo 1 contradiz a hipótese de infrahumanização das crianças, os Estudo 2 suporta-a parcialmente (os resultados são apenas marginalmente significativos) e o Estudo 3 corrobora a hipótese. Importa ainda referir algumas limitações e explicações alternativas para os resultados de cada estudo, indicando estudos *follow-up* que podem colmatar essas mesmas limitações. Os participantes no Estudo 1 podem ter realizado a tarefa de categorização usando uma estratégia de emparelhamento de valência dos alvos com o rótulo de categoria. Nomeadamente, podem ter associado todos os estímulos que percecionavam como mais positivos ao rótulo "pessoa" (que sendo o endogrupo acarreta uma valência mais positiva) e todos os estímulos que percecionavam como mais negativos ao rótulo "chimpanzé". Assumindo que os participantes percecionaram as faces de juvenis de ambas as espécies como mais positivas, esta será uma explicação possível para os resultados obtidos (i.e., trajetórias mais diretas para o rótulo "pessoa" quando os alvos eram crianças humanas e trajetórias menos diretas para o rótulo "chimpanzé" quando os alvos eram chimpanzés juvenis). Ao mesmo tempo, as propriedades das faces usadas como estímulos experimentais no Estudo 2 podem ter igualmente influenciado de forma imprevista os resultados deste estudo. Os participantes podem ter percecionado as faces de adultos como sendo estrangeiras (de facto, as fotografias foram retiradas de uma base de dados internacional) e portanto como sendo membros de um exogrupo. Para além

disso, os participantes podem ter reagido com estranheza ao verem fotografias de crianças com expressão facial neutra, dado que estamos habituados a ver fotografias de crianças em que elas estão a sorrir. Planeia-se correr um estudo *follow-up*, implementado digitalmente (o que poderá evitar alguns erros de participantes do Estudo 2 que acabaram por atribuir mais do que uma palavra a uma face e/ou não atribuíram nenhuma palavra a algumas das faces), tendo como estímulos experimentais fotografias de adultos e crianças de nacionalidade portuguesa e com expressão sorridente. Por outro lado, os resultados do Estudo 3, que apoiam a hipótese, podem não se replicar com uma lista de palavras diferente. Uma replicação conceptual deste estudo, em que uma nova amostra de participantes classifica uma nova lista de palavras nas dimensões de tipicamente humano a tipicamente animal, positivo a negativo e relacionado com crianças a relacionado com adultos, está presentemente em curso. Desta feita, a lista de palavras usada foi gerada por outras duas amostras independentes de participantes, que listaram atributos tipicamente associados às categorias de animal e humano, e às categorias de criança e adulto, respetivamente. Se os resultados deste estudo *follow-up* replicarem os do Estudo 3, saberemos que palavras que ocorrem naturalmente às pessoas quando pensam em "animal" (i.e., palavras geradas para a categoria animal) são percebidas como mais relacionadas com crianças do que com adultos. Em suma, os dados dos três estudos apresentados ao longo deste trabalho não oferecem uma resposta conclusiva à questão - "Será que infrahumanizamos as nossas crianças?". Como tal, e porque acredito que o problema de investigação é relevante tanto social como teoricamente, são necessários mais estudos experimentais que testem a hipótese de infrahumanização das crianças. Um destes possíveis estudos é apresentado com mais detalhe na parte final da tese. Neste estudo procura-se compreender de que forma o tipo

de relação que as pessoas estabelecem com as crianças prediz se irão infrahumizá-las, através de uma replicação conceptual do Estudo 3, recolhendo dados de três grupos diferentes. Estes grupos diferem entre si no tipo de relação que estabelecem com as crianças, um dos grupos é composto por prestadores de cuidados, um outro por profissionais da educação e outro ainda por pessoas que não têm crianças à sua responsabilidade (servindo como grupo de controlo). Prevê-se que sejam encontradas diferenças entre estes grupos, sendo levantadas diversas hipóteses quanto a possíveis direcionalidades desses mesmos efeitos e discutidas as suas diversas implicações teóricas.

Palavras-chave: Infrahumanização, Crianças, Desumanização, Animalístico, Mouse-tracking.

Aknowledgments

Words fail me when it's time to thank the people, that I am so grateful God has placed on my path. First, I wish to thank my Supervisor, Sara Hagá, Ph.D whose example, whose tender and wise advice has changed my perception of Academia, and more importantly of myself. Sara, you made me believe I will one day have a place in Academia. Pursuing this new research programme, has been like walking in the dark, looking for something we believe is there but don't yet see. Science is our GPS, bur we still feel lost sometimes, yet I do not worry because I trust in your guidance, and enjoy the conversations we have along the way. Second, I would like to thank our research assistants: Madalena, my little "sis", I thank you for all the work you have done, and more importantly I am gratefull for your presence and friendship. Miguel everytime we played chess you "kicked my ass", I never thought we would end up here, but I am glad we did and I thank you for your dedication. I also wish to thank Professor Leonel Garcia Marques, for changing my view of "this thing called science", by teaching me about the New Experimentalism, patiently answering all my questions, which ended up changing my stance on the replicability debate. Father and Mother, thank you for having done so much for me, ever since you gave me life. Thank you Mother for making me believe in myself, and thank you Father for all the times you helped me with my homework. Grandma, I am gratefull for all you have done for me, in your hour of need, you were still able to calm, confort, and encourage me, you have my love and gratitude. Lastly, I thank all my friends, and colleagues for being there, for sharing all the bad and good times, making the bad times better, and the good times great.

Do we infrahumanize our children?

Infrahumanization was defined by Leyens, Demoulin, Vaes, Gaunt and Paladino (2007) as considering other groups less human than our own. The present work aims to test the hypothesis that children, as a social category, are infrahumanized. In order to frame different theoretical arguments that support this infrahumanization of children hypothesis, a brief overview of the infrahumanization literature follows. First, I present different historical perspectives highlighting important theoretical frameworks, definitions, and distinctions. I then review, common and innovative, experimental paradigms, used to study infrahumanization. Next, I present infrahumanization studies in which children are either participants and/or targets of infrahumanization. I end by defending the infrahumanization of children thesis, highlighting its societal and theoretical implications, and explaining the present work's approach to testing this hypothesis.

Historical perspectives

Infrahumanization can be described as a subtle form of dehumanization (e.g., Bain, Park, Kwok, & Haslam, 2009). Because its study traces its roots to the dehumanization research tradition, I will begin by presenting some relevant findings and theoretical positions from the dehumanization literature.

In 1973, Kelman argued that in large group conflicts, human beings are capable of denying others their humanity and engage in mass killings and genocides. Even though much more subtle forms of dehumanization have been theorized, researchers to this day are still interested in the grave social consequences of these phenomena (e.g., Castrano & Giner-Sorolla, 2006; DelLuca, 2009; Waytz & Schroeder, 2014).

Before the term infrahumanization appeared in the psychological literature, Bandura, Underwood and Fromson (1975) studied dehumanization in a smaller scale and through experimental methodologies. These authors studied the impact of victim dehumanization on aggression, explaining it through the lens of social learning theory (Bandura,

Underwood, & Fromson, 1975).

Twenty five years later, the term infrahumanization was coined by Leyens et al. (2000). Leyens et al. (2000) drew from the notion of the essentialism of social groups provided by Campbell (1958), arguing that if people are biased towards their ingroup, people must ascribe the human essence to their ingroup and deny it to the outrgroup. Leyens et al. (2000) asked a sample of French speaking and a sample of Spanish speaking participants to generate a list of what they considered to be uniquely human characteristics. From those characteristics they decided to focus on the emotional aspect of the human essence, an aspect that concerns the supposedly uniquely human ability of feeling secondary emotions (the French word *sentiment*, the Spanish word *sentimiento*). In their ground-breaking work, the authors present empirical evidence of a greater attribution of secondary emotions to the ingroup than to the outrgoup (Leyens et al., 2000).

Following Leyens et al. (2000) pioneering work, several theoretical debates have emerged in the infrahumanization literature and other related domains. These include debates over distinct forms of dehumanization and infrahumanization (Haslam, Loughnan, Reynolds, & Wilson, 2007; Waytz & Schroeder, 2014), the relation between objectification and dehumanization (Fiske, 2009; Gervais, Bernard, Klein, & Allen, 2013), and predictors, moderators, and strategies to reduce dehumanization and/or infrahumanization (Haslam & Bain, 2007; Hodson & Costello, 2007; Bennett, 2008; Costello & Hodson, 2010; Pereira, Vala, & Leyens, 2009; Costello & Hodson, 2012; Capozza, Falvo, Bernardo, Vezzali, & Visitin, 2014; Trouson, Critchley, & Pfeifer, 2015; Hugenberg et al., 2016; Szuster & Wojnarowska, 2016), just to name a few.

Theoretical Frameworks

Several theories have since been developed to explain infrahumanization, while others were adapted to account for the phenomenon.

Kelman (1973) framed dehumanization as the third type of processes, from a triad

that leads to mass killings, with the first being authorization, and the second routinization. Kelman (1973) argues that if a group is seen as clearly distinct, and perceived as inferior, it meets the necessary conditions to then be dehumanized. I reason that this account shares an essentialist view of dehu/infrahumanization with that of Leyens et al. (2000). Both works present a view that members of an infrahumanized group need to be perceived by others as sharing a common essence, so others can then deny them of their human essence. Kelman's (1973) framework can account for the infrahumanization of children, if there was proof that they are also perceived as inferior, given that they are arguably a distinct social category. Notwithstanding one can speculate that children can perceived as inferior, having less social power, developed competences, and arguably less ability to make moral judgments.

Using a social representations approach (see Moscovici, 1988), several authors have studied infrahumanization-like phenomena under the term "ontologization" (Pérez, Moscovici, & Chulvi, 2002, 2007; Vala, Pereira, & Costa-Lopes, 2009; Berti, Pivetti, & Battista, 2013;). This theoretical framework claims that some social groups are more discriminated than others, and are categorized outside the social map, not being perceived as fully human (Pérez et al., 2002). According to Pérez et al. (2002) perspective, culture defines humans while nature defines animals. Groups that suffer ontologization are categorized based on nature but not on culture. One would hardly outright state that children are more discriminated against than other groups, though adopting this perspective, one could imagine how children are categorized based on nature. Notwithstanding, this framework is not the most favorable to the infrahumanization of children hypothesis. It follows that if this hypothesis finds empirical support, ontologization has to be more clearly distinguished from infrahumanization, or the theoretical framework of ontologization needs to be revised to better account for it. I argue either case would constitute theoretical progress in social psychological science.

In 2006 Haslam proposed, when reviewing the dehumanization literature, that two

distinct forms of dehumanization exist — one is animalistic and the other mechanistic. For Haslam (2006) humanness can be perceived in two ways — one relates to the central features of the category "human" (Human Nature), while the other relates to what distinguishes us from other animals (Uniquely Human). If we deny an outgroup uniquely human characteristics, we are dehumanizing them animalistically (perceiving them as animals). If, in turn, we deny them their human nature, we are perceiving them as objects (mechanistic dehumanization). Haslam continued to argue in favor of this perspective, throughout some of his later works (Haslam, Loughnan, Reynolds, & Wilson, 2007; Haslam, 2013). Using this taxonomy, one can say that the current work tests the infrahumanization of children hypothesis through an animalistic perspective. This was a conscious choice, given that one more intuitively thinks of children being infrahumanized by having their uniquely human (e.g., higher intellectual abilities), rather than their human nature characteristics (e.g., emotional responsiveness), denied. However, it is not farfetched to think about children having their human nature denied as well, if one considers human nature versus mechanistic dehumanization to encompass characteristics such as depth versus superficiality, or agency versus passivity (see Haslam, 2006 p.257 for a more comprehensive diagram). This perspective also offers some creative insights into future experimental studies, testing the infrahumanization of children hypothesis.

In the same year as Haslam's review, Harris and Fiske (2006) used the stereotype content model to successfully predict the dehumanization of outgroups perceived to have low warmth and competence ("the low of the lowest"). Using neuroimaging techniques, Harris and Fiske (2006) present evidence of the dehumanization of drug addicts and homeless people. Fiske (2009) builds on these ideas and suggests that dehumanization can be avoided, if perceivers have goals that can only be achieved by making inferences about the target's mind (e.g., consider their preferences). The stereotype content model also poses some interesting questions in regard to the infrahumanization of children hypothesis, such as: Are children viewed as having low competence, given their dependence on adults? Are

children at the same time perceived has scoring high in the warmth dimension? If so, they cannot be considered as being the "lowest of the low", since they would be placed on the low competence high warmth quadrant. The stereotype content model would then predict people feel pity for children, which we can conceive as being in line with some anecdotal evidences from our day to day lives. If children are indeed placed in the low competence high warmth quadrant, together with other social categories like elderly people, this does not mean that they are safe from dehumanization. Groups placed in this quadrant are often targets of paternalistic stereotypes (Fiske, Cuddy, Glick and Xu, 2002) and also considered to be victims of paternalistic dehumanization (i, Leidner and Castano, 2014).

Goldenberg, Heflick, Vaes, Motyl, and Greenberg (2009) tried to explain infrahumanization effects and the objectification of women. These authors reason that the threat of mortality leads people to focus on their and their ingroup uniquely human aspects, which in turn results in the dehumanization and/or objectification of other social groups (Goldenberg et al., 2009). This theoretical approach to dehumanization offers a very unique and curious perspective on the infrahumanization of children hypothesis, if one posits that children's younger age could trigger adults' perceptions of mortality. Then, according to Goldenberg et al. (2009), adults would reinforce their ingroup cultural contributions (a uniquely human characteristic) distancing themselves from children.

Waytz, Epley and Cacioppo (2010) frame dehumanization as the opposite of anthropomorphism (i.e., ascribing uniquely human characteristics to non-human entities), arguing that it can be predicted by some of the same psychological variables. According to these authors, the more a non-human entity is perceived as being similar to humans, or even to the self, the more anthropomorphized it will be (Waytz, Epley, & Cacioppo, 2010). Waytz et al. (2010) line of reasoning then states that the more dissimilar to the ingroup an outgroup is perceived to be, the more dehumanized it will be. These authors (Waytz et al., 2010) claim that this explanation can account for the dehumanization of the "lowest of the low" (i.e., homeless people and drug addicts) reported by Harris and Fiske (2006). In

addition, Waytz et al. (2010) also mention high sociality and low effectance motivation as predictors of dehumanization, given that low sociality and high effectance motivation predict anthropomorphism. One could argue that children, as a social category, are perceived as quite dissimilar from the self and the ingroup (adults) since they have quite distinct characteristics (e.g., age, height, weight, developmental level) and social roles from those of adults. Therefore, according to Waytz et al. (2010) theoretical approach, children would be dehumanized, and not anthropomorphized.

Costello and Hodson (2010) developed the interspecies model of prejudice, framing the belief in the human-animal divide as a predictor of immigrant infrahumanization, mediated by social dominance (Pratto, Sidanius, Stallworth, & Malle, 1994) and universal orientations (Phillips & Ziller, 1997). They reason that the more someone perceives humans as superior to other animals, the more susceptible they are to dehumanize an outgroup perceived as inferior. These researchers even use this model to explain prejudice among children (Costello & Hodson, 2012). Given that this model mainly focus on individual characteristics that predict and moderate dehumanization, it is hard to frame how this model would account for the general infrahumanization of children hypothesis. However, it interesting to consider how a greater belief in the human animal-divide, comparing to a lower belief in human animal-divide, would impact people's perception of children. More specifically, would people with a strong believe in the human-animal, perceive children as human, and never infrahumanize them. Given that their black and white representation of either human or animal, would not allow them to think of children as a little less human and a bit more animal-like? On the other hand, people with a strong belief in human-animal divide tend to also have a high social dominance orientation, and therefore have a more hierarchical world view. If they perceive young children as having low social power, could they think of them as animals, only until they reach a certain age, at which stage those people's great belief in the human-animal divide would led them categorize children as fully human?

Gervais, Bernard, Klein, and Allen (2013) proposed a unified theory of objectification and dehumanization based on the global versus local processing model (Förster & Dannenberg, 2010), similar to the construal level theory (Trope & Liberman, 2010). They argue that a local processing of women's body features leads to their objectification, and speculate that dehumanization processes can cause lead to the gravest forms of objectification (Gervais et al., 2013). Gervais et al. (2013) mainly focus on the objectification of women, thus providing little insights into the theoretical support for the infrahumanization of children hypothesis. Nonetheless, Gervais et al. (2013) present interesting perspectives from the global versus local processing model that may spark creative insights for future empirical studies. For example, does priming participants to focus on local versus global attributes of children lead to dehumanization? Or in a similar vein, does priming a concrete construal level lead to greater dehumanizing word attributions, than priming an abstract construal level?

Li, Leidner and Castano (2014) propose a new taxonomy of dehumanization, bridging several aforementioned theoretical approaches, notably the stereotype content model approach (e.g., Harris & Fiske, 2006), and the distinction between animalistic and mechanistic forms of dehumanization (Haslam, 2006). According to these authors human uniqueness and human nature are two axes, from which four quadrants of dehumanization emerge. Groups are humanized when they score high on both human uniqueness and human nature, while groups that score low on both axes are doubly dehumanized (Li, Leidner, & Castano, 2014, p.292). Animalistic dehumanization happens to groups perceived as having low human uniqueness and scoring high on the human nature dimension, groups perceived through the opposite pattern (high human uniqueness but low human nature) are mechanistically dehumanized (Li, Leidner, & Castano, 2014, p.292). The infrahumanization of children hypothesis also appears as probable, when seen through this perspective. As previously stated, one could argue that children score high on the human nature dimension, but score low on the human uniqueness dimension, and are thus

animalistically dehumanized.

Infrahumanization research has also focused on looking for mediators of the infrahumanizing processes. Pereira, Vala and Leyens (2009) studied the mediating role of symbolic threat (i.e., a sense that one's group's values and beliefs are at risk) in infrahumanization and discrimination. Pereira et al. (2009) succeeded in manipulating the humanization of a negatively perceived outgroup and showed that symbolic threat mediates the relation between infrahumanization and discrimination. Some authors, drawing from the social dominance theory, have studied the influence of individuals' social dominance orientation on dehumanizing behavior and attitudes (Costello & Hodson, 2010; Trouson, Critchley, & Pfeifer, 2015). Findings from these studies reveal that individuals with greater social dominance orientation dehumanize others more than individuals with a lower social dominance orientation (Costello & Hodson, 2010; Trouson, Critchley, & Pfeifer, 2015).

Several authors have also drawn some distinctions between different forms of dehumanization. I review some of their arguments, though these distinctions are not crucial for the purposes of the present work. Nonetheless, if one finds evidence of the infrahumanization of children, they may prove informative in understanding how one can classify those infrahumanization of children effects.

Waytz and Schroeder (2014) draw a distinction between two forms of dehumanization, namely dehumanization by commission or dehumanization by omission. If in the first form people deny outgroups humanity, such as in the case of intergroup conflicts, in the latter form people simply fail to recognize others as fully human, which is a more common form of dehumanization in day to day life (Waytz & Schroeder, 2014).

Hodson, Kteily, and Hoffarth (2014) argue that people's prejudice towards others originates in the human-animal divide, and that disgust plays a role in dehumanization, something they claim infrahumanization research should take into account. However, I believe Costello and Hodson (2010) interspecies model of prejudice already textitasizes the importance of beliefs in the human-animal divide. In addition, Fiske et al. (2002), Harris

and Fiske (2006, 2011), and Fiske (2009) already account for disgust in their studies of dehumanization, which I think renders Hodson et al. (2014) arguments somewhat trivial.

Defining human

"ALL ANIMALS ARE EQUAL.
BUT SOME ANIMALS ARE MORE EQUAL
THAN OTHERS."

Orwell (1945|2008)

Given a possible definition of infrahumanization — "Infra-humanizing outgroups involves considering outgroups less human and more animal-like than the ingroup, which is perceived, in essence, as fully human."(Leyens et al., 2007, p. 139) —, some questions can puzzle the reader. What does being "fully human" really means? What separates human beings from other animals?

In this section, I review perspectives from markedly different fields that propose some answers to these questions. The reader will probably be quick to realize that many definitions of "being human" overlap each other, with characteristics such as rational thinking and complex emotions emerging as consensual.

If we go as far as to look at the titles of the three books comprising David Hume's (1739) work "*Treatise of Human Nature*", we see that the first is "*Of the Understanding*", the second "*Of the Passions*", and the last "*Of Morals*". One would then define human as a rational being (capable of understanding), who is also emotional (has passions), and a moral agent capable of distinguishing between right and wrong.

Other philosophers have also attempted to define human. Cohen (2006) argues that Kant's definition takes into account both the biological and cultural aspects of human beings, serving as a good premise for anthropological works. Deely (2005), in his philosophical work, argues that the human being is the only semiotic animal, meaning the

only animal capable of understanding and using signs to achieve his or her goals (for clarification of the term "sign" see Deely, 2001). Deely (2005) then argues that this new definition of human as a semiotic animal is an improvement on defining human as *res cogitans* (thinking thing) and an important philosophical breakthrough.

One philosophical debate is of great interest for the infrahumanization of children hypothesis, namely the debate of whether children can think philosophically. Some philosophers have questioned if it is possible to teach philosophy to children (Kitchener, 1990; White, 1992; Wilson, 1992), while others defend that children can be taught philosophy (Haynes & Murris, 2011; Murris, 2000). Although this is a complex debate, going beyond the question of whether or not children think critically, I argue that it still shows that children's status as *res cogitans* (thinking things) is questioned. If the same discipline (i.e, philosophy) has used that same expression to define human, can this be interpreted as children not being perceived as fully human by some philosophers?

Psychological approaches to the questions of what it means to be fully human, or what humanness is, have provided important insights. Kelman (1973) realized that if dehumanization is defined as denying others' humanity, then we must define what it means to be perceived as fully human. Kelman (1973) then argues that we ascribe humans a unique identity and a community (similar concepts to those proposed by Bakan, 1966) which they are part of. Denying these characteristics to outgroups leads to them being dehumanized.

Leyens et al. (2000) posit that social groups are perceived as sharing a common essence. A social group can be denied its human essence, while still being perceived as sharing a common essence. Leyens et al. (2000) asked French speakers and Spanish speakers to generate a list of what they considered to be uniquely human characteristics. "The most often cited characteristics were, in rank order: intelligence (reasoning, thinking, etc.), sentiments-sentimientos (or exemplars of this category), language (communication), positive sociability (sociable, fun-loving, etc.), values (justice, solidarity, etc.), and negative

sociability (cruel, nasty, etc.)." (Leyens, et al., 2000, p.188). From those characteristics, Leyens et al. (2000) frame secondary emotions as central to the human essence, arguing that denying outgroups those emotions constitutes evidence of infrahumanization. Within this framework, the infrahumanization of children hypothesis gets credence from the fact that secondary emotions are thought to appear later in development (Kemper, 1987). If we consider these emotions central to the human essence, and argue that children do not feel them yet, we are denying children that (piece of) human essence. One could posit that children are simply incapable of feeling secondary emotions and that this does not mean that people are denying children their human essence, that it is a simple matter of human development. I argue that, even if it is true that young children do not feel secondary emotions , the fact that people base their definition of human on emotions children are not yet able to feel, can be a infrahumanizing bias.

Pérez, Moscovici and Chulvi (2002) offer a new perspective, stating that culture defines humans while nature defines animals, and that when social groups are categorized based on the nature of animals ontologization occurs. More important for the infrahumanization of children hypothesis is that one can easily imagine children as being "evoked through the positive nature of animals" (Pérez, Moscovici, & Chulvi, 2002, p.51).

Demoulin et al. (2004) contribute to this debate furthering the understanding of lay theories of emotion, providing empirical evidence that people naturally distinguish between uniquely human and non-uniquely human emotions, placing them on a continuum. Their work reinforces the idea that people reason that uniquely human emotions appear later in development (Demoulin et al., 2004).

Marcu, Lyons and Hegarthy (2006) provide a different perspective after interviewing six groups (three in Romania and three in Britain) on human and animal life dilemmas. Using their qualitative methodology "Four themes were identified: *rational autonomy*, *sentience*, *speciesism*, and *maintaining materialist and postmasterialist values*." (Marcu, Lyons, & Hegarthy, 2006, p.2). Marcuet al. (2006) argue that the distinction between

human and animals is constructed ideologically through a dialectic approach, opposing Demoulin et al. (2004) position of a universal continuum.

In turn, Haslam (2006) presented a much more detailed list of characteristics representing human uniqueness and human nature,contrasting them with antonyms representing animalistic or mechanistic dehumanization. As a reminder, according to Haslam (2006) uniquely human characteristics are those that distinguish us from other animals, while characteristics of human nature are those that are central to the concept of human, but may be shared with other animals. Civility, refinement, moral sensibility, rationality, logic, and maturity are all examples of uniquely human traits; while emotional responsiveness, interpersonal warmth, cognitive openness, agency, individuality, and depth are examples of characteristics of human nature (see Haslam, 2006, p.257). Regarding these traits, which largely overlap with previous definitions, I call the reader's attention to the fact that "maturity" is considered a uniquely human trait, which further supports the infrahumanization of children hypothesis.

Bain, Park, Kwok, and Haslam (2009), across three cross-cultural studies, found empirical evidence supporting the division of humanness into human uniqueness and human nature. Bain et al. (2009) demonstrated that some groups are dehumanized in an animalistic way (e.g., Australians as dehumanized by Chinese participants), while others were dehumanized in a mechanistic manner (e.g., Chinese as dehumanized by Australian participants). As previously mentioned, the current work's empirical tests of the infrahumanization of children hypothesis place a greater focus on animalistic forms of infrahumanization, rather than on mechanistic ones. The reasoning behind this choice was that the denial of human uniqueness traits to children both intuitively and based on prior theorizing feels more likely than the denial of characteristics of human nature.

Studying Infrahumanization

The infrahumanization literature has been enriched by a great diversity of experimental paradigms. I briefly describe some of these paradigms in order to situate the current work.

One such paradigm is the Implicit Association Test (IAT), developed by Greenwald, McGhee, and Schwartz (1998). The IAT tests the association between two target concepts and a pair of attributes. Across trials, participants have to associate one of the two targets with one of the two attributes by pressing the same key (e.g., the left key), and associate the other target and attribute by pressing another key (e.g. the right key). Those associations are then reversed on later trials. Imagine participants take longer to respond on trials on which an attribute — pleasant — is associated with the same key as one of the concepts — Black (African American), than when the same attribute — pleasant — is associated with the other concept — White (see Greenwald, McGhee, and Schwartz, 1998, p.1465). This would mean that participants implicitly associate Black with the unpleasant attribute more than they associate Black with the pleasant attribute. The IAT has since been adapted by several authors to study implicit forms of infrahumanization (Leyens et al., 2000; Paladino et al., 2002; Viki et al., 2006; Goff, Eberhardt, Williams, & Jackson, 2008; Goff, Jackson, Leone, Culotta, & DiTomasso, 2014). In these adapted versions of the IAT, the above examples of Black and White are replaced by an ingroup and an outrgroup, and the examples of pleasant and unpleasant attributes are replaced by human (e.g., secondary emotions; Leyens et al., 2000) or animal (i.e, not uniquely human, e.g., primary emotions, Leyens et al., 2000) attributes. If participants take longer to respond on trials in which the key mapped to the human attribute is also mapped to the outgoup than when it is mapped to the ingroup, then this constitutes evidence of infrahumanization of that outgroup.

Several authors have asked participants to perform lexical decision tasks, in order to test for the infrahumanization of outgroups (Boccato, Cortes, Demoulin, & Leyens, 2007; Delgado, Rodríguez-Pérez, Vaes, Leyens, & Betancor, 2009). The lexical decision task

consists in asking participants to decide whether stimuli are words or non-words. After viewing ingroup primes (e.g., photos of ingroup members) participants recognized words with names of secondary emotions faster than when they saw outgroup primes (Boccato et al., 2007; Delgado et al., 2009).

A common methodology in infrahumanization studies consists in asking participants to rate words across different dimensions, to then calculate correlations between these dimension to measure infrahumanization (Haslam, Bain, Douge, Lee, & Bastian, 2005; Hodson & Costello, 2007; Bain, Park, Kwok, & Haslam, 2009; Miranda, Gouveia-Pereira, & Vaes, 2014). In these studies, participants usually rate a set of words according to how typical of humans versus animals, how typical of an ingroup versus outgroup, and how positive or negative, they perceive them to be. If the human typicality inversely correlates with outgroup typicality, while controlling for valence (since the attribution of more negative words to an outgroup constitutes prejudice but not necessarily infrahumanization), this is evidence of infrahumanization. In other words, if the more human a word is rated, the less typical of an outgroup it is considered to be, then that outgroup is being perceived as less human, *ergo* it is being infrahumanized. This methodology was the foundation of the paradigm used to test the infrahumanization of children hypothesis in Study 3.

Another paradigm that inspired the present work is the one used in Study 2a and 2b of Viki et al. (2006), in which participants matched a stimulus word to a name. Results from these studies revealed that participants assigned more typically human stimulus words to ingroup names (e.g., British names) than to outgroup names (e.g., French names).

Some authors have taken a quite different approach, focusing on the understanding of the brain areas activated (or inhibited) when perceiving others as less human. To this aim they collected neuroimaging data (Harris & Fiske, 2006; Harris, Lee, Capestany, & Cohen, 2014).

In more recent years, some authors have used deviations from normal face processing (of human faces) as evidence of infrahumanization (Hugenberg et al., 2016; Fincher &

Tetlock, 2016; McLoughlin, Tipper, & Over, 2017).

For as clever and creative these measures are, they represent more or less indirect evidence of infrahumanization effects. On the far end of the spectrum, and arguably the more explicit measure of dehumanization, is the work by Kteily, Bruneau, Waytz, and Cotterill (2015). These authors asked participants to rate how evolved they considered several social groups to be, by placing them in the "ascent of man" illustration (the cliché pictorial representation of human evolution, dubbed "The March Of Progress").

Infrahumanization and Children

Several studies in the infrahumanization literature have children as targets, as participants, or both. Note however that none of these studies shares the same goals as the present work. These studies do not test the infrahumanization of children hypothesis. Instead, they focus on understanding when and how children start to infrahumanize others, or test for the infrahumanization directed at children as a subset of exemplars from a given outgroup.

Learning to infrahumanize. Martin, Bennett, and Murray (2008) found that children rated the secondary emotions felt by their ingroup (Scottish) as more intense than the primary emotions, while intensity ratings for both emotion types did not differ for the outgroup (English). This means that children, not only distinguish between primary and secondary emotions, but also that they show the same infrahumanizing biases as adults. Similar findings are reported by Costello and Hodson (2014), constituting the first empirical evidence that White children infrahumanize Black children, while highlighting the social dominance orientation of parents as a predictor of child prejudice.

However, differences between infrahumanization effects in children and adults have also been reported. In Rodríguez, Villar, Rodríguez-Pérez, and Rodríguez (2016) norms study, children's perceptions of humanity from emotional expressions differed from the perceptions of adults. More recently, McLoughlin, Tipper, and Over (2017) found that

older children perceive outgroup faces as less human than faces from ingroups. In addition, McLoughlin et al.(2017) research further supports the hypothesis that infrahumanization can be distinguished from prejudice.

Infrahumanizing "their" children. One work involving children has focused on testing whether children from a specific social group are denied their full humanity and perceived as less human. Meaning, this study has tested the infrahumanization of a particular subset of targets from a given outgroup (African-American), namely children (i.e., African-American children). Goff et al. (2014) presented empirical evidence of the infrahumanization of African-American children. This dehumanization was shown in innocence judgments and police violence directed at children.

The current research

Having reviewed the important theoretical debates and advances, and showcased the most relevant experimental paradigms, in the infrahumanization literature, I present (and reiterate some previously presented) theoretical arguments supporting the infrahumanization of children hypothesis. I then present a brief overview of the experimental studies, constituting the empirical body of this work.

Why study the infrahumanization of children? To answer this question, I first remind the readerof some previously presented arguments.

Leyens et al. (2000) showed that secondary emotions are perceived as part of the human essence, and therefore that denying those secondary emotions to outgroups constitutes infrahumanization. Secondary emotions are theorized to develop with age (Kemper, 1987). If we (adults) consider these emotions central to human essence, and state children do not yet experience them, are we denying children of their human essence? Or, from another perspective, do adults define human nature based on characteristics they know children do not yet possess?

If the reader will make a conscious effort to recall anecdotal episodes of

infrahumanization of children from daily life, a few will likely come to mind. For example, hearing people say "Children are little monsters!" (in casual conversations), or more affectionately "You are a cute little monkey" (while addressing a child). I believe Figure 1 constitutes another anecdotal example, it was part of an advertisement campaign, for the Lisbon Zoo, appearing in billboards throughout the city. I have even found some expressions in the infrahumanization literature that can be interpreted as infrahumanizing children. Consider for the following example from DeLuca (2009, p.1) doctoral dissertation: "It involves denying that outgroups have the capacity to feel secondary emotions, which are emotions that are considered uniquely human, as opposed to primary emotions that are shared by young children and animals mainly because they are less cognitively complex.".

Figure 1: An advertisement campaign for the Lisbon Zoo (2016)

The study of historical dehumanizing expressions by Saminaden, Loughnan, and Haslam (2010) shows that native tribes have been perceived as animal and child-like, an association that persists to this day. This evidence lead one to believe that children may have been infrahumanized (the hypothesis presented in the current work) for quite a long

time.

In evaluating the relevance of the present work, one should ponder on its possible societal and theoretical implications. Children are dependent upon adults in their daily lives and, as citizens, they also rely on the political decisions made by adults. If the infrahumanization of children hypothesis gathers enough empirical support, we are forced to consider how this could bias our (adults') decisions regarding their wellbeing and think of ways to mitigate this bias. On the other hand, if we consistently find that children as a social category are not infrahumanized, we might get a step closer to identifying key aspects that prevent social groups from being dehumanized, even when they might not have the typical characteristics we associate with the human essence.

From a theoretical standpoint, evidence of the infrahumanization of children would raise the question - When denial of secondary emotions is often times the definition of infrahumanization itself, how can members of a social category not be infrahumanized if they are considered not to feel secondary emotions,? At the same time, this kind of evidence would provide a strong case to the contention that groups that are generally liked can be infrahumanized all the same.

In contrast, finding no evidence of infrahumanization of children leads to questions like - How can a group, arguably perceived to be low in competence (e.g., lacking complex reasoning skills) and incapable of complex emotions, be perceived as fully human? Answering this question could lead to important insights into what characteristics are essential for social groups to be infrahumanized.

The current empirical approach. The research programme presented in the current work draws from the rich research tradition on infrahumanization. An overview of the experimental studies reported in this work follows.

In Study 1 a simple speedy categorization task of human and chimpanzee faces, of both adult and juvenile individuals, tested for evidence of people's implicit stronger association of human adult targets to the label "person" (when compared to the association

of human children's faces to the same label). Using a mouse-tracking paradigm to record participants' hand movements while completing the categorization task has the advantage of being able to detect infrahumanization signs at a very implicit level. Thus, it is not dependent on participants expressing any infrahumanizing biases consciously.

Study 2 tested for explicit attributions of typically human and typically animal words to children's and adults' faces. More specifically, it tested the hypothesis that more typically human words would be attributed to adults than to children.

Lastly, Study 3 focused on people's use of language, testing if people perceive typically human words to be more typical of adults than children, while controlling for confounding effects of valence.

I believe that investing in a diversity of methods employed to test the infrahumanization of children hypothesis was a good approach to this incipient research programme, paving the way for future research on this subject.

Study 1

The infrahumanization hypothesis states that people perceive children as less human than adults. One can argue, that if children are infrahumanized, it is because we more easily associate exemplars of adult, than we exemplars of children, to the category human/person. Study 1's test of this hypothesis was quiet implicit, participants performed a simple face categorization task, of human and chimp, adult and child targets. In the critical task, participants saw pictures of human and chimp faces, of juvenile and adult individuals, and had to classify them as "Person" or "Chimpanzee". This task tested if participants mental representation of adult is closer to their representation of person, than the representation of child. If this is so, then they would more directly associate child human faces to the person label (by clicking on it), than they would associate adult human faces. While participants performed this task, mouse-tracking software recorded their mouse pointer trajectories. Straighter trajectories would indicate a more direct association

between the face and the "person" label, and longer curvilinear trajectories would signal the opposite. Perceptual and cognitive systems continuously update motor responses, and therefore studying hand movements can offer a window to cognition (Spivey, Richardson, & Dale, 2008). This means, that by looking at mouse pointer trajectories, researchers can make, and test, inferences about mental processes. We used the MouseTracker software package, that records a new mouse coordinate 60-75 times every second (60Hz), it provides accurate hand movement data. It is important to note that while participants are engaged in the categorization task, they do not know that their mouse pointer coordinates are being monitored. Therefore, participants respond as they naturally would in a computer task that requires mouse input, without making extra inferences about the hypothesis being tested.

Method

Participants. Sixty-eight volunteers recruited by social psychology students, participated in this experiment. Demographics of four participants, due to experimenter mistake, were not recorded, however we report the demographics of the other 64 participants ($M_{\text{age}} = 21.39$, SD = 6.12, 35 female),

Materials. A set of 32 pictures of human faces and 32 of chimpanzee faces were the experimental stimuli in this experiment. Each set of 32 photographs was comprised by 16 photos of adults and 16 photos of juveniles individuals. Two research assistants collected the 32 pictures of chimpanzees from public websites. The 16 pictures of human adults (8 female) were selected from the Karolinska Directed Emotional Faces (KDEF; Lundqvist, Flykt, & Öhman, 1998) database, and the 16 pictures of human children (8 female) were part of a database created by my supervisor. All human faces were of a happy facial expression because people are more used at looking at photos of kids smiling, and find it odd when they have a neutral facial expression, and we wanted adult and child faces to be of the same facial expression. All the photos were full-face portraits, meaning the camera captured the subject looking at it in a frontal view. Furthermore, some procedures ensured

that all 64 pictures were as similar in photographic properties as possible, namely the photos were resized, converted to gray-scale, the contrast and brightness were adjusted and the background was digitally removed.

Procedure. Participants came to our lab, participated in several experimental studies, within a 50-minute session, including this experiment, which took them about 15 minutes to complete. After giving their informed consent (by pressing a button on the screen), they read the instruction and performed six practice trials (categorizing pictures as fruits or vegetables), and only then performed the actual experiment. Participants performed a person vs chimp categorization task, classifying target faces as being a person or chimpanzee, clicking on the appropriate label ("Pessoa" = Person or "Chimpanzé" = Chimpanzee). In addition, participants completed an adult vs child categorization task, in which they decided were the target were adults or juveniles, by clicking on one of two labels ("Adulto"=Adult or "Criança"=Child). The practice trials, and both categorization tasks, were all implemented in MouseTracker, which tracked participants mouse pointer trajectories. Immediately after performing both categorization tasks, participants responded to a Qualtrics survey. In that survey, they answered questions about, how easy or hard they perceived each of the two categorization tasks to be (in a 5-point scale from extremely easy to extremely hard), their level of familiarity with computers, with children. In the same survey, after entering their demographics they read a debriefing, and were thanked for their participation. During the categorization tasks, participants saw human and chimpanzee faces, of both adult and juvenile individuals. In total, participants viewed 64 pictures, 16 of human adults (8 female), 16 of human children (8 female), 16 of adult chimpanzee, and 16 of juvenile chimpanzee. Participants saw the target faces, during these categorization tasks, in a randomized order. Furthermore, participants performed the categorization task in a counterbalanced order. Meaning, half of the participants first performed the adult vs juvenile categorization task followed by the person vs chimp categorization task. The other half of the participants completed the person vs chimp

categorization task first, and only then moved on to the adult vs child categorization task. In addition, during these tasks, the location of the labels (left or right), was also counterbalanced between-participants, by assigning participants to one of the eight possible combinations. As explained above, besides categorizing target faces as person or chimp, participants also performed another task in which they categorized the targets as adult or child. We only expected to find significant differences, in participants trajectories, between human adult, and human juvenile targets, on the human vs chimp categorization task. Despite this, we included the adult vs child categorization task, to rule out participants difficulties in perceiving the experimental stimuli as an alternative explanation for our results. In addition, this task would also make it harder for participants to guess the study's main hypothesis. It is also important to note that immediately after clicking on the start button, participants had to begin moving their mouse pointers, whose trajectories were recorded in real-time by MouseTracker software. It is very important, in mouse-tracking experiments, that participants begin moving their mouse immediately after seeing the experimental stimuli. As previously explained, mouse-tracking data can offer a window to participants cognition, by recording hand movements that are continuously updated by perceptual and cognitive systems. However, if participants process the visual stimuli first, commit to a response, and only then begin moving their mouse, that hand movement data will offer no clues about their previous processing. In this experiment, when participants took longer than 400 milliseconds to begin moving their mouse, a warning appeared (at the end of the trial). This warning instructed participants to begin moving their mouse sooner, even if they were still uncertain about their response.

Results

The Analyzer software, bundled with the Mousetracker, makes it possible to visualize the previously recorded mouse pointer trajectories. This allows the removal of trajectories containing loops, a common practice in the literature (Farmer, Cargill, Hindy, Dale, &

Spivey, 2007; Freeman, Ambadym, Rule, & Johnson, 2008; Freeman & Ambady, 2011; Freeman, 2013) , since these trajectories can introduce measurement errors. Trajectories where participants made categorization errors (e.g., clicking on the "person" label for a chimp face, or on the "child" label for an adult face) were also excluded from the analysis. In addition to response times, I report maximum deviation (MD), and area under the curve (AUC) computed from mouse-tracking data. Since mouse-tracking data is rich in its offer of several kinds of measurements, it lends itself to several statistical analyses. Therefore it is important that researchers choose the appropriate measures and statistical analyses to test their hypothesis, reducing the risk of spurious findings. As a reminder, we hypothesized that if children are infrahumanized, then the association between and adult face and the "person" label should be more straightforward (i.e., digress less) than the association between a child face and the "person" label. Since our hypothesis concerns digressions from a straight trajectory we tested it by looking at the area under the curve (AUC), and maximum deviation (MD), measures computed from mouse-tracking data. Looking at Figure 2, the maximum deviation would be the distance measured perpendicularly to the straight line of a perfect trajectory, to the point in participant's trajectory that most deviates from that perfect straight line. The area under the curve, would be the area contained between the participant's trajectory, and the straight line.

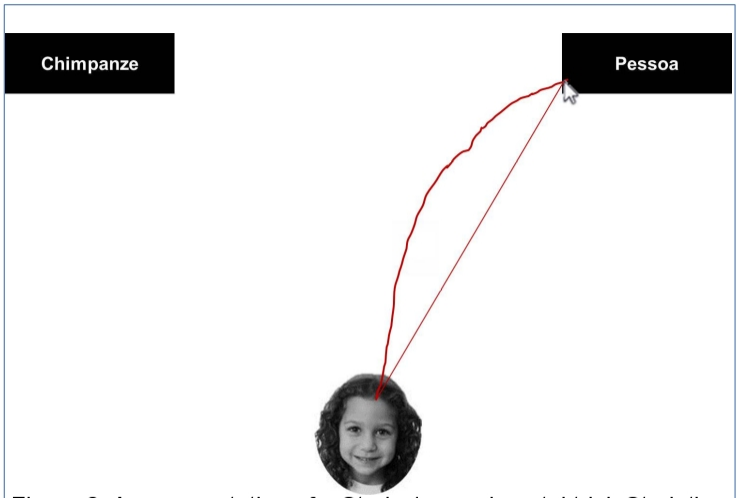

Figure 2: A representation of a Study 1 experimental trial. Straigth line represents a perfect trajectory, curve line represents a participant's trajectory.

We ran a 2 (categorization block order: person/chimpanzee first vs. adult/child first) x 2 (target species: human vs. chimp) x 2 (target age: adult vs. child) mixed ANOVA, with the last two factors within-participants, on the AUC and MD data. The ANOVA revealed a statistically significant interaction between target species and age, $F(1,44) = 9.92$, $p = .003$, $\eta_p^2 = .184$, such that the AUC for child human targets was smaller than for adult human target, and the reverse was true for chimpanzee targets. These results run contrary to our hypothesis, revealing that participants more easily categorized child targets as persons than adult targets. The same pattern of results was found for the MD measure, $F(1,44) = 9.52$, $p = .\ 004$, $\eta_p^2 = .178$. The ANOVA for the AUC measure shows that participants who performed the person versus chimp categorization first made straighter trajectories (in that task) than participants who performed it last, $F(1,44) = 4.15$, $p = .048$, $\eta_p^2 = .086$. This order effect was not significant for the MD measure, $F(1,44) = 2.95$, $p = .093$, $\eta_p^2 = .063$. However, the order factor did not interact with any of the other factors. Mousetracker software also records participants' response times (RTs), which are a more common measure in the psychological literature. The same significant interaction between target species and age emerged, $F(1,44) = 5.63$, $p = .022$, $\eta_p^2 = .114$. While participants were quicker at associating child human targets than adult human targets with the "person" label, they were quicker at associating adult chimp targets than child chimp targets with the "chimpanzee" label, $F\ (1,44) = 5.63$, $p = .022$, $\eta_p^2 = .114$. No order effects were found in this analysis.

It may also prove informative to look at the results for the adult versus child categorization task. If participants had some difficulties in correctly perceiving the experimental stimuli as faces of adults or juveniles (e.g: if they were not able to distinguish between adult and juvenile chimpanzees) results from this study may be uninterpretable. Looking at results for the adult versus child categorization tasks allows us to better understand if those confounds are present or not.

We ran identical ANOVAs to the ones described above on the same measures (i.e.,

AUC, MD, and RTs), but this time for the trajectories participants made when categorizing a face (independently of their species) as child or adult. Results for these three measures all follow the same pattern. Participants categorized the age of human faces more easily and quicker than the age of chimp faces (AUC: $F(1,44) = 6.68$, $p = .013$, $\eta_p^2 = .132$; MD: $F(1,44) = 7.81$, $p = .008$, $\eta_p^2 = .151$; RT: $F(1,44) = 52.67$, $p < 001$, $\eta_p^2 = .545$). Participants also displayed greater ease in associating child faces with the appropriate label, than adult faces, independently of their species (AUC: $F(1,44) = 5.35$, $p = .025$, $\eta_p^2 = .108$; MD: $F(1,44) = 4.27$, $p = .045$, $\eta_p^2 = .088$; RT: $F(1,44) = 27.61$, $p < .001$, $\eta_p^2 = .386$). The ANOVAs show no significant order effects, nor significant interactions between any of the factors.

As previously mentioned, participants also reported how hard they perceived each categorization task (adult vs child, and person vs chimp) to be, for the sake of completeness we report the means, and confidence intervals for the mean, of these ratings. Participants considered both tasks were easy, however they perceived the human (vs) chimp categorization task to be easier than the adult (vs) child task, since there is no overlap between the confidence intervals for the mean, $M_{\text{humanvschimp}} = 1.44$, 95%CI = [1.22, 1.65]; $M_{\text{adultvschilmp}} = 2.13$, 95%CI = [1.93, 2.33].

Discussion

Contrary to the infrahumanization hypothesis, results show that participants categorized children as people more easily than adults. The cognitive psychology research tradition on face perception may offer key insights to interpret these results. Two important effects in this literature come to mind: the own age effect, and the own race effect (for extensive see: Meissner & Brigham, 2001; and Wright & Stroud, 2002; Anastasi & Rhodes, 2005, respectively). People are better at recognizing faces of people from the same age group, when compared to older or younger people – the own age effect. In a similar vein, people better recognize others from the same race, than from another race –

the own race effect. If participants were better at individuating faces from their own age group (i.e., adults) and from their own species (i.e., humans; a possible extension of the own race effect), this might have, somewhat paradoxically, make it harder for them to categorize those faces using a generic term such as “person”. Another alternative explanation for our results is that participants might have based their categorizations simply on targets’ valence. Assuming that participants associated the “person” label with a positive valence and children faces (independently of their species) also with a positive valence, this could account for our results.

However, this study has some limitations that precludes us from drawing conclusive interpretations. Firstly, in mouse-tracking paradigms such as the one we used, the labels of the categories play an important role. Both labels should capture categories that are presumably active (and exerting attraction) during the categorization process. We chose the label "chimpanzee" instead of “animal”, which would be a more obvious choice in an infrahumanization study, because we worried that "animal" and "person" were not mutually exclusive, since people are animals, too. However, even if we infrahumanize children, it is not likely that we activate the category "chimpanzee" when we look at children.

Secondly, stimuli for this experiment came from a non-Portuguese face database. This could have led participants to perceive adult targets as members of an outgroup, and not their ingroup. As for the chimpanzee and bonobo faces, they came from websites listed on Google Images, which means that they were not rigorously standardized.

We are in the process of planning a follow-up to overcome this limitations, while at the same time providing an equally implicit measure of the infrahumanization of children. This follow-up’s experimental paradigm, could either be based on the implicit association test, or on a go/no-go task. In this follow-up participants would see pictures of children and adults, as well as some typically animal and typically human stimuli. If participants concept of child is closer to the concept of animal, than their concept of adult is, their response times for trials in which the response for child targets is the same as the response

for typically animal stimuli. For the implicit association test, this would mean longer response times for the trials in which the responses for child targets, and typically animal stimuli are assigned to different hand keys (e.g: a left hand key for animal, and a right hand key for children), than when they are assigned to the same key press. On a go/no-go task, longer response times for trials in which the response behavior for child targets is different (e.g: go) from the response behavior for typically animal stimuli (e.g: no-go), than when they are both associated to the same response (e.g: go). As this follow-up study is still in a planning phase, our choice of experimental materials, both for adult and child targets, and typically animal and human stimuli, is not set on stone. One possible choice, for the go/no-go task, would be to show participants pictures of children, and adults, while also showing typically human and typically animal words. Before describing Study 2, that collected a more explicit measure of infrahumanization (participants explicit assignments of words to adult and child faces), I report on the pilot study, that was needed to pre-test materials for that experiment.

Pilot Study 1

This pilot study aimed to collect judgments, on four dimensions, for a set of adults' and children's photos, in order to help select the material for Study 2. These four dimensions were: physical attractiveness, likeability, intelligence, and niceness.

Method

Participants. Thirty psychology undergraduate students ($M_{\text{age}} = 20.00$, $SD = 3.43$, 28 female) participated in this experiment, being rewarded with student credits.

Materials. The stimuli tested in this pilot study were 14 pictures of adults' (7 male and 7 female) and 14 pictures of children's (7 male and 7 female) faces. The adults' photos were retrieved from the KDEF database and the children's photos were retrieved from the Child Affective Facial Expression (CAFE) set. As in Study 1, adults' and children's photographs were of full-face (frontal view) portraits, and were also edited to match

brightness and contrast (in gray-scale). Unlike Study 1, all targets had a neutral facial expression. In Study 2, where we planned to use these pictures, participants would be assigning words from a list containing both positive and negative words. We chose neutral facial expressions because, we reasoned, they would be the least likely to influence the valence of the words participants would assign to faces in Study 2.

Procedure. All participants rated all 28 photos in the following dimensions: physical attractiveness, likeability, intelligence, and niceness, using 7-point rating scales. For the attractiveness, intelligence, and niceness dimensions, the scales ranged from "not attractive/intelligent/nice at all" to "very attractive/intelligent/nice". Participants provided their ratings for the likeability dimension by responding to "How much do you think you would like each one of these people, if you met them?" from "nothing at all " to "a lot"). Participants rated all the child faces, across all dimensions, in a single block, and all provided all the ratings for the adult faces in a separate block. After completing both blocks, participants provided some demographics, answered two questions about their daily interactions with children, and were thanked for their collaboration. The two questions about participants contact with children, were identical to those of Study1 (i.e., how frequent was the contact, and what was their relation/kinship with the children, e.g., nephews or neighbors).

Participants completed the child faces rating block, and the adult faces rating block in a between-participants counterbalanced order. In each block participants rated the photographs (appearing in a randomized order), for each of the 4 attributes, in a within-participants randomized order.

Results

We computed the means, standard deviations and confidence intervals for the mean for each of the 28 photographs, and for reasons of brevity we present them in Appendix A.

In this section, I present the results for the t-tests comparing the mean ratings of the

child photos with the ones of adult photos. Participants rated children higher in all dimensions: physical attractiveness ($M_{\text{child}} = 4.56$, $SD = 0.45$; $M_{\text{adult}} = 3.45$, $SD = 0.64$; $t(26) = 5.27$, $p < .001$), likeability ($M_{\text{child}} = 4.79$, $SD = 0.33$; $M_{\text{adult}} = 3.70$, $SD = 0.26$; $t(26) = 9.70$, $p < .001$), intelligence ($M_{\text{child}} = 4.52$, $SD = 0.19$; $M_{\text{adult}} = 4.06$, $SD = 0.22$; $t(26) = 5.89$, $p < .001$), and niceness ($M_{\text{child}} = 4.50$, $SD = 0.41$; $M_{\text{adult}} = 3.87$, $SD = 0.48$; $t(26) = 3.72$, $p = .001$). To try to balance this positive bias towards children, we chose the 5 female, and the 5 male adult faces that participants rated higher in all dimensions. We did the opposite for the child photographs, keeping an equal number of female and male faces as well. Ratings for this subset of 20 pictures were still significantly higher for children in all dimensions (physical attractiveness $M_{\text{child}} = 4.41$, $SD = 0.45$, $M_{\text{adult}} = 3.51$, $SD = 0.73$, $t(18) = 3.31$, $p =.004$; likeability $M_{\text{child}} = 4.70$, $SD = 0.40$, $M_{\text{adult}} = 3.80$, $SD = 0.24$, $t(18) = 6.86$, $p < .001$; intelligence $M_{\text{child}} = 4.44$, $SD = 0.16$; $M_{\text{adult}} = 4.13$, $SD = 0.21$; $t(18) = 3.74$, $p = .001$) except for niceness ($M_{\text{child}} = 4.36$, $SD = 0.36$, $M_{\text{adult}} = 4.08$, $SD = 0.37$, $t(18) = 1.76$, $p = .095$).

Discussion

The data collected on this pilot study not only allowed for the selection of stimuli for Study 2 (i.e., the 20 adult and child photos) but also provided evidence that children are indeed positively perceived. This reinforces the notion that, if they are infrahumanized, then that effect cannot be attributed to prejudice.

Study 2

The experimental paradigm of Study 1 tested for implicit evidence of infrahumanization of children. This study in turn aimed to collect evidence of the explicit assignment of infrahumanizing words to children faces, with a paradigm adapted from Viki et al. (2006). The modifications to Viki et al. (2006) paradigm consisted in selecting a different set of words, and having faces, not names, as targets. Going with faces instead of names facilitated the implementation of this study, since Portuguese names are hard to

associate with age groups (e.g., names like Tim Junior do not exist). In addition, measuring participants' assignment of words to faces, in contrast to names, is arguably a more explicit measure of infrahumanization. If people perceive children as less human than adults, then they will assign a greater number of typically human words to adult than to child faces.

Method

Participants. Sixty volunteers ($M_{\text{age}} = 21.30$, $SD = 2.78$, 34 female), recruited throughout university campi (similarly to Viki et al., 2006), participated in this study. As a reward participants received the possibility of entering a raffle to win one of two vouchers valued at 25 euros each.

Materials. From the pretested 28 photographs, 20 human faces, 10 of children (5 female and 5 male), and 10 of adults (5 female and 5 male) were part of the stimuli of this experiment. All photographs were full-face (frontal view) portraits of human faces, and were matched in brightness and contrast in gray-scale.

In addition to the set of 20 faces, a list of 24 words for which subjective ratings for humanness and valence were known, comprised the experimental stimuli for this study. In a previous pilot study, conducted by our lab, participants had rated 61 words on a 7-point rating scale. The rating scale for humanness ranged from "typically animal" to "typically human", and the valence rating scale ranged from "very negative" to "very positive" (when used to describe people or something related to people). From these 61 words we chose six words that had been rated as typically human and positive, six words rated as typically animal and positive, six words rated as typically human and negative, and six words rated as typically animal and negative.

As desired, in the final 24-words list, the human words were rated as more typically human than the animal words ($M_{\text{human}} = 5.87$, $SD = 0.69$; $M_{\text{animal}} = 2.80$, $SD = 0.57$; $F(1,20) = 152.93$, $p < .001$), but as equally positive or negative ($M_{\text{human}} = 3.73$, $SD = 2.02$; $M_{\text{animal}} = 4.05$, $SD = 1.29$; $F(1,20) = 2.36$, $p = .140$). The positive words were rated

as more positive than the negative ones ($M_{\text{positive}} = 5.40$, $SD = 0.60$; $M_{\text{negative}} = 2.38$, $SD = 0.68$; $F(1,20) = 202.21$, $p < .001$), but as equally human or animal ($M_{\text{positive}} = 4.52$, $SD = 1.52$; $M_{\text{negative}} = 4.14$, $SD = 1.89$; $F(1,20) = 2.33$, $p = .143$). Regarding valence a statistically significant interaction emerged, $F(1,20) = 11.07$, $p = .003$, which could not be corrected selecting other words from the original list. This interaction suggests that the human words were more extreme than the animal words, namely that the positive human words were rated as more positive than the positive animal words ($M_{\text{human}} = 5.59$, $SD = 0.58$; $M_{\text{animal}} = 5.21$, $SD = 0.60$) and that the negative human words were rated as more negative than the negative animal words ($M_{\text{human}} = 1.86$, $SD = 0.54$; $M_{\text{animal}} = 2.89$, $SD = 0.32$). The correspondent interaction regarding the humanness dimension was not significant, $F(1,20) = 1.79$, $p = .200$.

Procedure. After being approached by the experimenter who explained the tasks, and agreeing to participate, participants received four sheets of paper and a pen. Participants began by reading the instructions (first sheet). The instructions asked participants to select words from a list and associate them with photographs – each photograph should get a word and no words should be used twice. Then they matched a word (of their choice from a list of 24) to each one of 10 faces (second sheet). On the third sheet of paper, participants matched a word (from the same list of 24) to a new set of 10 faces. Next (on the last sheet) they provided some demographics and answered some questions about their contact with children. The experimenter then thanked the participant, collected the email address for the voucher raffle, and debriefed the participant. Participants saw the 10 faces of children, and the 10 faces of adults on separate sheets of paper, the order in each saw them (adults on the second sheet, children on the third or children on the second sheet and adults on the third) was counterbalanced between-participants.

Results

Following Viki et al. (2006)'s analyses, we first compared the number of human words participants assigned to adult faces with the one they assigned to child faces. However, in the current study, 20 out of 60 participants forgot to assign a word to a face and/or assigned the same word to more than one face. As a consequence, these participants' data could not be entered into the analysis, leaving us with a reduced sample size (i.e., $N = 40$ after discarding 20 participants). For these reasons, we do not consider that the type analyses used by Viki et al. (2006) to be the best to test our hypothesis, and therefore results from better suited analyses are also reported. A *t*-test for dependent samples shows no significant difference between the number of typically human words participants assigned to adults and to children ($M_{\text{adults}} = 5.70$, $SD = 1.11$; $M_{\text{children}} = 5.48$, $SD = 1.26$; $t(39) = 0.96$, $p = .341$). However, we do not consider that this analysis is the most appropriate because of all the data we had to discard.

Analyzing the differences in the proportion, instead of the number, of words assigned to each group, we were able to input the entire sample into the analysis. We entered the proportion of typically human words participants chose to assign into a 2 (target: adults vs. children) x 2 (valence: positive vs. negative) repeated measures ANOVA. This analysis identified a tendency for assigning more typically human words to adults than to children ($M_{\text{adults}} = .58$, $SD = .12$; $M_{\text{children}} = .54$, $SD = .14$; $F(1,59) = 3.28$, $MSE = .005$, $p = .075$, $\eta_p^2 = .053$). A marginally significant interaction between target and valence, $F(1,59) = 3.54$, $MSE = .009$, $p = .065$, $\eta_p^2 = .057$, suggests that this tendency was mainly driven by the positive human words, such that participants tended to assign more positive human words to adults than to children ($M_{\text{adults}} = .31$, $SD = .11$; $M_{\text{children}} = .27$, $SD = .10$), but the same proportion of negative human words to adults and children ($M_{\text{adults}} = .27$, $SD = .12$; $M_{\text{children}} = .27$, $SD = .15$). The main effect of the valence of the assigned human words was not statistically significant, $F(1,59) < 1$.

We conducted yet another kind of analysis using each word's perceived humanness

value. Since the ratings for the humanness of each word were known, we replaced each word assigned to a face by its humanness value and entered these values into a *t*-test for dependent samples. This analysis reveals a marginally significant tendency to assign words that are more typically human than typically animal to adults in comparison to children ($M_{\text{adults}} = 4.51$, $SD = 0.40$; $M_{\text{children}} = 4.40$, $SD = 0.42$; $t(59) = 1.78$, $p = .080$).

Discussion

Results from Study 2 show tentative evidence supporting our infrahumanization of children hypothesis, given that in some analyses no differences between the number of human words assigned to adults and children were found, while in others these differences were marginally significant. One intriguing result, that we did not predict, is that this effect seems to be driven by a greater number of positive words assigned to adults than to children.

Furthermore when looking at the descriptive statistics of Study 2 data, we discovered an intriguing finding, participants in our experimental study assigned less typically human words to their ingroup (i.e., adults: $M = 5.70$, $SD = 1.11$) than the participants in Viki et al. (2006)'s studies –(i.e., British – Study 2a: $M = 6.66$, $SD = 1.56$; Study 2b: $M = 7.16$, $SD = 1.44$). So how can one account for this intriguing finding? Well first we must acknowledge the fact that the word stimuli used in this study, was different from the one used by Viki et al. (2006). Therefore, some particular properties of the experimental stimuli of Study 2, can account for the lower number of positive woman words assigned to the ingroup, when compared with Viki et al. (2006) results. However, another possible explanation is that participants in our study perceived both adult and child faces as members of an outgroup and neither as being members of their ingroup. Since the experimental stimuli originated from international databases, the targets were in fact non-Portuguese, and participants might have perceived them as foreigners based on their facial features.

It is also important to reflect on the fact, that some analyses yielded marginally significant results, while others showed no significant differences between between words assigned to adult targets and words assigned to children. Note that the analyses that yielded marginally significant results were ran on data from our entire sample, while the latter were run on a subset of this sample, thus the latter type of analyses had less statistical power. Therefore one could hypothesize that this infrahumanization of children effect is small enough, that this marginally significant difference, could reach significance when tested on a bigger sample.

Moreover some additional limitations of this experimental study may have further hindered our ability to detect the hypothesized effect. We tried to match adult and child targets' perceived physical attractiveness, likeability, intelligence, and niceness, based on Pilot Study 1 participants' ratings (and admittedly were only successful in doing so for the niceness dimension). Using these criteria may have led us to pick the most adult-like children, and child-like adults to use as experimental stimuli in this experimental study. If this is true, participants could have perceived adult-like children as more human than they would perceive more child-like children, and could have done the opposite for child-like adults. This potential artifact could have partly masked an infrahumanization of children effect. However this possibility warrants empirical test.

We also opted for the use of neutral faces as stimuli for this experiment, reasoning that smiling faces could influence participants' assignments of positive or negative valence words. However, people apparently are not accustomed to seeing face pictures of children in which they are not smiling. This could have led them to perceive the children in an unnatural way. While collecting data, I gathered anecdotal evidence, based on participants' reaction upon looking at the photographs of children and after completing our study, supporting this possibility.

As previously mentioned, one third of the participants in this experimental study failed to follow the instructions regarding the mutually exclusive and exhaustive

assignment of words to faces, which raises the question whether the instructions were clear enough. In addition, those restrictions can themselves be questioned. One of the restrictions participants had in assigning words to the faces was not repeating words within the same set of targets. This could have forced participants to select words that they did not feel strongly applied to that face. These worlds could coincidently be of an opposite typicality, lowering our chances of detecting an infrahumanization effect even further. However, there seems to be no reasons to consider that these restrictions (also present in Viki et al., 2006) could have introduced anything but random noise. It is also important to note that we instructed participants to assign words they would associate with that target, not necessarily words that could be used to describe its facial features.

Pilot Study 2

We conducted this post-test study to better understand how Study 2 stimuli were perceived, addressing some of the aforementioned alternative explanations for our previous results. An independent sample of participants rated how much they considered that each target looked: foreign, adult-like, mean-faced, and devious.

Participants' subjective ratings of how foreign the targets look might shed some light on whether Study 2 participants treated both adults and children as members of an outgroup.. At the same time, the participants' ratings might elucidate whether children's neutral facial expressions made them seem aggressive in a general way (mean-looking), or more particularly in a rational, adult-like way (devious).

I also discussed the possibility that while selecting the stimuli for Study 2, by trying to match the ratings obtained in Pilot Study 1, we may have chosen the more child-like adults and adult-like children. In this pilot study, participants' ratings for perceived adult-likeness, as well as the measurements made by the research assistants, provide some evidence regarding this possibility.

Method

Participants. Thirty one volunteers (M_{age} = 23.65, SD = 7.06, 8 female), from our lab's participant pool agreed to participate in this pilot study.

Materials. The Stimuli for this pilot study were the same 28 photographs pre-tested in Pilot Study 1. Even though we aimed to address alternative explanations for Study 2 results, which employed only 20 of those photographs, having the ratings for all the pre-tested faces introduced little complexity and could be useful for future studies.

Procedure

Participants came to our lab and participated in this study as part of a 45 minutes experimental session. This pilot study took about 10 minutes.

Following Pilot Study 1 procedure, participants rated how much they considered each of the 28 faces looked: foreign, adult-like, mean-faced, and devious. As in Pilot Study 1, we implemented the tasks in Qualtrics, and participants rated all attributes in 7-point rating scales.

Participants judged how much each face looked foreign by answering the question "How foreign does each person look to you?" in a scale ranging from "doesn't look foreign to me at all" to "looks definitely foreign to me".

To rate adult-likeness, participants first read the explanation "Some [children/adults], independently of their age, seem to have a more "child-like personality", while others seem to have a more "adult-like personality"". Next they answered the question "What do you feel is the case of each one of these [children/adults]?" on a scale from "much more child-like" to "much more adult-like".

Participants rated how much each target looked mean-faced on a scale from "does not have a mean-looking face" to "definitely has a mean-looking face", after reading the introduction "Some people, independently of their age, have a mean-looking face". It doesn't mean that they are mean in reality. Nor that they'll frequently do mean things.

It's just a feeling we get when we look at them.".

To rate how much each target looked devious, participants read the introduction "Some people, independently of their age, seem to be a bit devious, disloyal, manipulative. People who tend to put their own interests above anything else and use others to satisfy those interests." and then used a scale ranging from "not devious at all" to "very devious".

Participants rated child and adult faces in separate blocks, and after completing both blocks participants provided some demographics. Then participants answered the same two questions about their daily interactions with children, as participants in the Pilot Study 1, and were thanked for their participation. As in Pilot Study 1 participants completed the child faces rating block, and the adult faces rating block in counterbalanced order. Moreover, in each block the photographs appeared in a randomized order, and each of the four attributes appeared in a within-participants randomized order as well.

Results and Discussion

We calculated the means, and confidence intervals for the mean, for each and every of the 28 adult and child targets. For the sake of brevity, those results are not reported in their full extension here, but can be seen in Appendix B. Note that the 10 photographs of children and the 10 photographs of adults used in Study 2 appear first in those Appendices, while the photographs pre-tested in Pilot Study 1 (four of children and four of adults) but not used in Study 2, appear as the last four entries of their respective table.

We also calculated the means and confidence intervals for the means, of the average ratings of child and adult targets (foreign: $M_{\text{children}} = 3.01$, $SD = 0.80$, 95%CI = [3.58, 2.43], $M_{\text{adults}} = 3.55$, $SD = 0.88$, 95%CI = [4.18, 2.91]; adult-like $M_{\text{children}} = 3.30$, $SD = 0.53$, 95%CI = [3.67, 2.92], $M_{\text{adults}} = 4.17$, $SD = 0.98$, 95%CI = [4.87, 3.46]; mean-looking $M_{\text{children}} = 3.04$, $SD = 0.80$, 95%CI = [3.61, 2.46], $M_{\text{adults}} = 2.65$, $SD = 0.82$, 95%CI = [3.23, 2.06]; deviousness $M_{\text{children}} = 2.69$, $SD = 0.70$, 95%CI = [3.19, 2.19], $M_{\text{adults}} = 2.78$, $SD = 0.62$, 95%CI = [3.21, 2.33]).

We also computed the correlations between the dimensions rated by participants in Pilot Study 1, the humanness, and proportion of the words assigned to both adult and child targets by participants in Study 2, and ratings in the dimensions rated by participants in this Pilot Study 2.

For adult faces, adult-like perceptions correlated with physical attractiveness ratings, $r = .759$, $p < .05$. Adult-like perceptions also correlated with perceived intelligence ($r = .870$, $p < .05$), mean-looking perceptions ($r = .771$, $p < .05$), and deviousness ($r = .785$, $p < .05$). Ratings in the mean-face dimension, in turn were correlated with perceived niceness ($r = -.773$, $p < .05$), and perceived deviousness ($r = .918$, $p < .05$). In addition, ratings of perceived deviousness of adult faces also correlated with ratings of perceived intelligence, $r = .638$, $p < .05$.

Child faces likeability negatively correlated with how foreign they were perceived to be ($r = -.849$, $p < .05$), and how mean-faced they were also perceived to be ($r = -.886$, $p < .05$). Foreign-looking perceptions negatively correlated with perceived niceness ($r = -.847$, $p < .05$), and positively correlated with mean-faceness ($r = .752$, $p < .05$). Participants perceptions of children mean-faceness correlated with niceness ($r = -.712$, $p < .05$), and with perceived deviousness ($r = .800$, $p < .05$).

As previously hypothesized, the pictures of adults and children used in Study 2, could have been perceived as foreign. Participants in this pilot study, rated how foreign each faced looked in a 7-point rating scale. The rating scale for how foreign a face looked, ranged from "doesn't look foreign to me at all" to "looks definitely foreign to me". Therefore if participants considered the targets as Portuguese natives, the confidence intervals should include the first point of the scale, which did not happen, either for children or adults($M_{\text{children}} = 3.01$, $SD = 0.80$, 95%CI = [3.58, 2.43]; $M_{\text{adults}} = 3.55$, $SD = 0.88$, 95%CI = [4.18, 2.91]). Note that for adult targets, the confidence intervals for the mean for foreign-looking ratings of six faces do not include the rating scales midpoint ($M_{\text{photo2}} = 4.84$, $SD = 1.57$, 95%CI = [4.26, 5.42]; $M_{\text{photo1}} = 4.35$, $SD = 1.82$, 95%CI =

[3.68, 5.02]; $M_{\text{photo12}} = 4.19$, $SD = 2.07$, 95%CI = [3.43, 4.95]; $M_{\text{photo8}} = 4.04$, $SD = 1.82$, 95%CI = [3.37, 4.79]; $M_{\text{photo9}} = 3.97$, $SD = 1.62$, 95%CI = [3.37, 4.56]; $M_{\text{photo14}} = 3.45$, $SD = 1.67$, 95%CI = [2.84, 4.06]). Similarly for three child targets, the same pattern of results was found ($M_{\text{photo7}} = 4.39$, $SD = 1.63$, 95%CI = [3.78, 4.98]; $M_{\text{photo13}} = 4.06$, $SD = 1.77$, 95%CI = [3.42, 4.71]; $M_{\text{photo11}} = 3.58$, $SD = 1.54$, 95%CI = [3.01, 4.15]).

Children's faces were quite intriguingly perceived as meaner-looking and more devious than one would expect (mean-looking $M_{\text{children}} = 3.04$, $SD = 0.80$, 95%CI = [3.61, 2.46]; deviousness $M_{\text{children}} = 2.69$, $SD = 0.70$, 95%CI = [3.19, 2.19]), which seems to support the notion that participants reacted with strangeness to seeing pictures of children in which they are not smiling.

We also computed the correlations between the dimensions rated by participants in Pilot Study 1, the humanness, and proportion of the words assigned to both

Results from this study are not conclusive, however they support the notion that it would be best to run a follow-up replication, with photographs of Portuguese people as the target stimuli. In addition, implementing the tasks digitally instead of using pen and paper, with revised instructions, could help participants understand the instructions better (than participants in Study 2), and not forget to assign a word to each and every face. Before In the next section, I describe Study 3, that used a different paradigm from all previous studies to look for evidence of the infrahumanization of children in people's use of language.

Study 3

This study aimed to test for evidence of the infrahumanization of children by looking at differences in language associated with adults and children. Framed in a more operationalized way, is the humanness of a word (how typical of humans it is) correlated with its adultness (how typical of adults it is)?

Actually, studying the degree to which uniquely human (vs. shared with animals) words are perceived to be typical of one's own ingroup is a common methodology to

measure infrahumanization (e.g., Haslam et al., 2005; Hodson & Costello, 2007; Bain et al., 2009; Miranda et al., 2014). To distinguish infrahumanization effects from prejudice, these studies compute partial correlations controlling for the valence of the words. By doing so, they guarantee the words are perceived as typical of the ingroup because they are uniquely human. Otherwise, one could not know if those correlations exist simply because people tend to favor their ingroup and associate positive words with it.

This means that to test our hypothesis following these procedures, one needs to know the perceived human versus animal typicality, child versus adult typicality, and valence of the words. As previously mentioned, our lab had data from a set of 61 words rated for human versus animal typicality, and for valence. Therefore, to achieve the goals of this third study, we needed only to collect the ratings for perceived child versus adult typicality, from a new independent sample of participants.

Method

Participants. Thirty volunteers ($M_{\text{age}} = 24.63$, $SD = 4.04$, 5 female), from our lab's participant pool participated in Study 3.

Materials. The 61 Portuguese words, previously pretested in our lab, comprised the stimuli for this experiment. These words were of different word classes (e.g., nouns, adjectives). Exemplars of the human, animal, child, or adult categories were not included.

Procedure. Participants came to our lab and participated in this experiment, which took about 10 minutes to complete, during a 45 minutes experimental session. Similarly to the previous pilot study, participants rated each one of the 61 words in a 7-point rating scale, indicating how much they thought each word referred to something related to children or adults. This rating scale ranged from "definitely child" to "definitely adult", with a midpoint labeled "neither child nor adult". After rating all 61 words, participants provided some demographics, and were then thanked for their collaboration in this study. All these tasks were implemented in a Qualtrics survey.rticipants came to our

lab and participated in this experiment, which took about 10 minutes to complete, during a 45 minutes experimental session. Similarly to the previous pilot study, participants rated each one of the 61 words in a 7-point rating scale, indicating how much they thought each word referred to something related to children or adults. This rating scale ranged from "definitely child" to "definitely adult", with a midpoint labeled "neither child nor adult". After rating all 61 words, participants provided some demographics, and were then thanked for their collaboration in this study. All these tasks were implemented in a Qualtrics survey.

Results

As predicted, results show that perceived human typicality is positively correlated with perceived adult typicality ($r(59) = .68$, $p < .001$). Results also show that valence is negatively correlated with adult typicality ($r(59) = -.33$, $p = .010$), but not with humanness ($r(59) = .045$, $p = .731$). The partial correlation between human and adult typicality, controlling for valence (following the previously explained common practices in the infrahumanization literature) yields an even stronger correlation ($r(58) = .74$, $p < .001$). See Figure 3, for a scatter plot, where each dot represents one of the 61 words, the x-axis corresponds to the humanness dimension, while the y-axis corresponds to the adultness dimension. Red dots indicate typically adult words (95%CI does not include the scales midpoint), yellow dots denote words typical of children (95%CI does not include the scales midpoint), and grey words a confidence intervals for the mean include the scales midpoint.

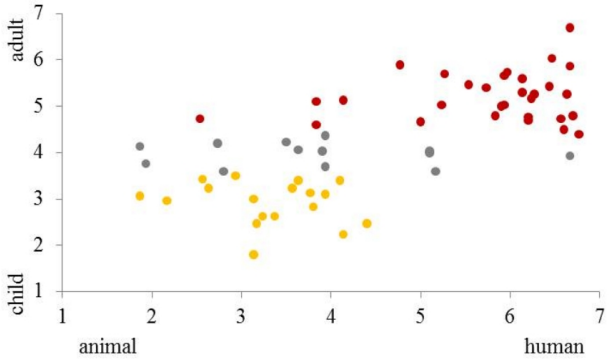

Figure 3: Scatter plot, x-axis humanness dimension, y-axis adult (vs) animal typicallity Each dot is a word, red dots are adult typical words, yellow dots are child typical words, grey dots are neither (their 95%CI includes scales midpoint).

Discussion

Results from Study 3 support our prediction that typically animal words are perceived as more typical of children, than typically human words. This means that the more typical of human a word is, the more typical of an adult it will be perceived to be, and that at this semantic level children are perceived as less human than adults.

Furthermore these results support our contention that children as a social category are positively perceived, since valence negatively correlates with adultness. This means that this infrahumanization of children effect is completely distinguishable from prejudice.

However, it is worth to ponder on some limitations of this study. First, the evidence it produced are correlational, which means that the results, like in any correlational study, offer no causality or direction for the effect found. Secondly, we know this infrahumanization of children effect is present for this list of 61 words, yet one needs future conceptual replications to know if this effect extends to the general use of language.

In order to establish whether Study 3 findings generalize to a new set of words, we are currently running a new study, following a somewhat different logic. First, we asked participants, from a new independent sample, to generate 10 attributes they thought of as typical of children and 10 attributes typical of adults. In addition, participants from yet another independent sample each generated 10 words typical of humans and 10 words typical of non-human animals. This part of the study is complete and we compiled a list of 97 new words, based on the most consensual attributes generated for the four categories (i.e., adults, children, human, animal). Now, we are running a replication of Study 3, replacing the 61 words list with the new list, and asking participants to rate each word in the same humanness, adultness, and valence dimensions. With this paradigm, our infrahumanization hypothesis is more severely tested, because participants are rating words other participants generated as prototypical of that category. Meaning, we are testing whether people consider the words that naturally come to mind when thinking of children as less human than the ones that come to mind when thinking of adults. At the same time,

this new paradigm also tests if words that naturally come to mind when thinking of animal are more typical of children than the ones that come to mind when thinking of adults. If this new follow-up study results support the children infrahumanization hypothesis, this will arguably constitute stronger evidence of the infrahumanization of children, than results from Study 3 (that did not test words that naturally come to people's mind when thinking of adults, children, humans, and animals). More importantly, if this follow-up study conceptually replicates Study 3, it will be an indicator that the infrahumanization of children could be a robust effect.

General Discussion

In the present work, the thesis that children as a social category, are perceived as less human than adults, was empirically tested across three studies, employing a variety of methodologies, and yielding similarly diverse results.

People perceive typically (non-human) animal words as being more typical of children than adults (Study 3). Moreover, people also tend to assign less typically human words to children's faces, than they do for adults' faces. In contrast, people link human children's faces to the label "person" faster, than they link human adults' faces to the same label (Study 1).

When arguing for the theoretical relevance of testing the infrahumanization of children hypothesis, I explained that finding evidence supporting this hypothesis would signal the identification of a positively perceived, but infrahumanized social category. Infrahumanization theories account for the existence of such social groups, still to my knowledge evidence of such groups is pretty scarce on the scientific literature. Pilot Study 1 and Study 3 results show that children, indeed are a positively perceived social category, by showing that their faces are positively perceived (Pilot Study 1), and that children typical words are also positively perceived (Study 3). Therefore, if the infrahumanization of children hypothesis gains empirical support, it will be one of the rare examples of positively

perceived but infrahumanized social groups.

Before proceeding any further, it pays to recall some limitations, and possible alternative explanations for this work's empirical studies. Study 1 and Study 2 could be particularly susceptible to confounds introduced by experimental stimuli properties. In Study 1 the perceived positive valence of juvenile faces (of both human and chimpanzee species), could have acted as cue, that participants took advantage of to make speedy decisions (for which Study 1 paradigm imposed severe time limitations). In turn, in Study 2 the faces of both children and adults could have been perceived as foreigner, and participants could have reacted with strangeness to seeing pictures of children in which they were not smiling. Given that this is an incipient research programme, I believe that the limitations of both of these studies, should be understood as an opportunity to learn about important variables one needs to control for when conducting studies on the infrahumanization of children. In the interest of rigor, it is also important to consider some limitations and possible alternative explanations for Study 3. Firstly, it could be due to some particular artifacts of the words chosen as experimental stimuli, meaning these findings would not replicate with a different set of words. However, there is no evidence that would lead one to believe that the chances of this alternative explanation being true are higher than chance. What could, in fact, be a more plausible alternative explanation is that the infrahumanization of children effect exists at a semantic level, in our use of language, but does not manifest itself in explicit infrahumanization of specific targets. If this explanation is true it accounts for Study 1's results running contrary to our hypothesis.

In short, Study 1 contradicts our infrahumanization of children hypothesis, Study 2 tentatively supports it, and Study 3 provides the most encouraging results to date. In addition, Pilot Study 1 and Study 3 both provide empirical evidence that, as predicted, children as a social category are positively perceived.

Taken together how can these findings help us answer the question that titled this work - "Do We Infrahumanize Our Children?" I dare to say that the answer they give to

this question is a resounding perhaps. I believe the sensible conclusion is that it is too early to tell, and that we need to conduct more studies testing the infrahumanization of children hypothesis. I consider that the follow-up studies we are are planning to run for Study 1, Study 2, and Study 3, will help us restrict alternative explanations and get one step closer to answering the research question. I would also like to add that given this an incipient research programme, I consider it might be best to apply Lakatos (1968-1969) negative heuristic, and deflect possible refutations of the children infrahumanization hypothesis to auxiliary hypothesis, namely the aforementioned limitations of our paradigms.

I could theorize about what psychological variables could moderate and predict the infrahumanization of children. I could theorize about the impact of previously mentioned individual variables, like social dominance orientation, belief in human-animal divide, or even a global versus a local processing of social stimuli. I could even speculate, as to how lay beliefs about human psychological development, like people's beliefs about children's cognitive, and/or moral capacity to reason and act, would predict people's tendency to infrahumanize (or not infrahumanize) children. I could also hypothesize that people's perceptions of the social power and roles of children (and even their own), in our societies, and their own sense of power and social roles, impact their humanness judgments of children. If I followed this last line of reasoning, I would have to consider how findings from studies testing those hypothesis would replicate (or not replicated) across cultures. I then could contemplate on the theoretical implications, of supporting or refuting each of those predictions. However, I honestly believe that it is to soon to consider these implications, and to predict what variables moderate an effect that we have yet to prove is robust. I consider that our efforts are best spent in understanding and planning how can we best test for the infrahumanization of children hypothesis. For these reasons I present a follow-up study that I hope will help achieve this goal.

Follow-up

I believe that when looking at whether or not, children as a social category are infrahumanized, it pays to reflect on some of the particular characteristics of this social category. Children are not (yet) fully independent members of society, they are still going through crucial stages of development, so that they can one day be so, and for these reasons are dependent of their caretakers (adults). Another way to frame this, is that some adults have children that they have to care, and are responsible for. Does people's form of contact with children impact their humanness judgments of this social category? To this in this follow-up we would replicate Study 3 procedure, with three distinct groups of participants. One group (parents) would be made up of people that are the main caretaker of one or more children, another group (professionals) would be made up of people whose profession involves taking care of children (e.g: day care professionals), and another group would be comprised of people who do not have to care for a child (control).

Method. We would aim for a final sample of 90 adult participants, 30 in each group, with no other selection criteria other than the aforementioned.

The same materials used in Study 3, would be used in this Follow-up. To conceptually replicate Study 3, participants would only have to rate the experimental stimuli for perceived child and adult typicality. Besides knowing the valence, and humanness ratings of the materials used in Study 3, we now know their child and adult typicality as well. This means that by using these materials as stimuli, we will able to test if results from our control group, match the results of Study 3.

Participants would rate each of the 61 words, using the same rating scale (ranging from "definitely child" to "definitely adult", with a midpoint labeled "neither child nor adult") as participants in Study 3. For purposes of conducting future exploratory analyses, of this Follow-up results, we could ask participants to rate the perceived quality, and demand of their interactions with children.

Predicted results and discussion

The same type of analyses used in Study 3, would be computed for each group separately. In addition, differences between child (vs) animal typicality ratings of each group would also be calculated.

I predict that results from the correlation analyses of our control group would follow the same pattern as those of Study 3. If a different pattern of results is found, this would undermine the validity of this Follow-up and even of Study 3. Given that it could mean that the control group of this Follow-up and some peculiar characteristic, thus not acting as a control group, or that Study 3 results were spurious and do not replicate. This failure to replicate Study 3 results with our control group, could also happen if the participant sample in Study 3, had enough heterogeneity in their frequency of contact with children. I have not extensively looked, at the responses to the final questions of the survey used in Study 3, but I predict that those participants would by and large could not be classified as caretakers or professionals. If only a very small subset of participants from Study 3, were caretaker or professionals, then one could exclude them from the dataset before performing this type of analyses. On the other hand, if we find that in Study 3, equally large subset of participants, could be classified as caretakers, professionals, and control, we would compare Study 3 results, with the results of our entire Follow-up study dataset. Following this heuristic, would lead us to test for the reliability of Study 3 results either way.

I predict that significant differences would be found between the caretakers and control groups, and between the professionals and control groups. I make no specific predictions, regarding differences between the caretakers and professionals group, or the direction of any of the effects. Theoretically I believe any of those differences are possible, and loud to interesting considerations. From a theoretical standpoint the control group differs from the other two (professionals and caretakers) in the frequency of the contact people have with children. However the caretakers and professionals group, differ in the form and quality of their relationships with children. One could speculate, that the

professionals group has experiences the same stresses of dealing with children as the caretakers group, but does not receive the same levels of bonding as a reward, thus they would tend to infrahumanize children more than the caretakers, and control groups. At the same time one could speculate, that caretakers feel more responsible for their children, than professionals do for the children in their work environment, and thus feel more stressed or even a greater feel of ownership (of "their children"), that leads them to infrahumanize children more (than the professionals group, and control groups). On the other hand people in the control group do not experience any of the stress of caring for children, but also engage in no emotional bonding. Would this, then lead the control group to infrahumanize children more or less than the professionals and caretakers group. I would just like to add that by reflecting about this questions, and the possible psychological variables involved, we would be able to craft some questions to include in the survey, that could help us test the validity of these explanations (e.g., "How stressed do you feel when interacting with children?").

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Appendix A

Results of the Pilot Study 1 per photograph

Children photos							
		Attractiveness ratings			Likeability ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1	male	5.07	1.08	[4.66, 5.47]	4.87	1.38	[4.35, 5.38]
2*	male	4.90	1.09	[4.49, 5.31]	4.90	1.27	[4.43, 5.37]
3	male	4.97	1.43	[4.43, 5.50]	5.13	1.43	[4.60, 5.67]
4*	male	4.60	1.30	[4.11, 5.09]	4.77	1.48	[4.21, 5.32]
5*	male	4.20	1.42	[3.67, 4.73]	4.73	1.36	[4.22, 5.24]
6*	female	4.27	1.53	[3.70, 4.84]	4.53	1.55	[3.96, 5.11]
7*	female	3.77	1.48	[3.21, 4.32]	4.03	1.52	[3.47, 4.60]
8	female	5.00	1.14	[4.57, 5.43]	4.80	1.27	[4.33, 5.27]
9*	female	4.90	1.32	[4.41, 5.39]	5.03	1.38	[4.52, 5.55]
10*	female	4.10	1.52	[3.53, 4.67]	5.03	1.33	[4.54, 5.53]
11*	male	4.87	1.33	[4.37, 5.36]	4.80	1.45	[4.26, 5.34]
12*	male	4.77	1.25	[4.30, 5.23]	4.97	1.27	[4.49, 5.44]
13*	female	3.77	1.45	[3.22, 4.31]	4.23	1.50	[3.67, 4.79]
14	female	4.67	1.60	[4.07, 5.27]	5.17	1.37	[4.66, 5.68]

Photos marked with * were selected as stimuli for Study 2

Children photos

		Intelligence ratings			Niceness ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1	male	4.60	1.00	[4.23, 4.97]	4.57	1.48	[4.01, 5.12]
2*	male	4.57	1.22	[4.11, 5.02]	4.63	1.45	[4.09, 5.17]
3	male	4.63	1.00	[4.26, 5.01]	5.30	1.09	[4.89, 5.71]
4*	male	4.27	1.05	[3.88, 4.66]	4.13	1.38	[3.62, 4.65]
5*	male	4.47	1.01	[4.09, 4.84]	4.33	1.37	[3.82, 4.85]
6*	female	4.33	1.15	[3.90, 4.76]	4.10	1.49	[3.54, 4.66]
7*	female	4.13	1.33	[3.64, 4.63]	3.87	1.50	[3.31, 4.43]
8	female	4.87	1.07	[4.47, 5.27]	4.67	1.42	[4.14, 5.20]
9*	female	4.63	0.85	[4.32, 4.95]	4.77	1.30	[4.28, 5.25]
10*	female	4.47	1.17	[4.03, 4.90]	4.97	1.33	[4.47, 5.46]
11*	male	4.63	1.00	[4.26, 5.01]	4.37	1.43	[3.83, 4.90]
12*	male	4.53	1.04	[4.14, 4.92]	4.53	1.41	[4.01, 5.06]
13*	female	4.40	1.19	[3.95, 4.85]	3.93	1.51	[3.37, 4.50]
14	female	4.70	0.99	[4.33, 5.07]	4.87	1.22	[4.41, 5.32]

Photos marked with * were selected as stimuli for Study 2

Adults photos

		Attractiveness ratings			Likeability ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1*	male	2.67	1.15	[2.24, 3.10]	3.57	1.36	[3.06, 4.07]
2*	male	2.93	1.14	[2.51, 3.36]	3.67	1.40	[3.14, 4.19]
3	male	3.17	1.26	[2.70, 3.64]	3.43	1.22	[2.98,3.89]
4	male	3.80	1.30	[3.32, 4.28]	3.50	1.25	[3.03, 3.97]
5*	male	3.27	1.31	[2.78, 3.76]	3.90	1.27	[3.43, 4.37]
6*	male	2.83	1.05	[2.44, 3.23]	3.63	1.07	[3.24, 4.03]
7*	male	2.83	1.23	[2.37, 3.29]	3.77	1.45	[3.22, 4.31]
8*	female	4.07	1.26	[3.60, 4.54]	3.63	1.19	[3.19, 4.08]
9*	female	4.63	1.03	[4.25, 5.02]	4.40	1.10	[3.99, 4.81]
10	female	3.30	1.02	[2.92, 3.68]	3.57	1.17	[3.13, 4.00]
11	female	2.93	1.14	[2.51, 3.36]	3.33	1.24	[2.87, 3.80]
12*	female	3.40	1.25	[2.93, 3.87]	3.77	1.38	[3.25, 4.28]
13*	female	4.00	1.23	[3.54, 4.46]	3.80	1.35	[3.30, 4.30]
14*	female	4.50	1.36	[3.99, 5.01]	3.90	0.92	[3.56, 4.24]

Photos marked with * were selected as stimuli for Study 2

Adults photos

		Intelligence ratings			Niceness ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1*	male	4.07	1.20	[3.62, 4.52]	3.67	0.99	[3.30, 4.04]
2*	male	4.17	0.99	[3.80, 4.53]	4.20	1.30	[3.72, 4.68]
3	male	4.03	1.19	[3.59, 4.48]	3.60	1.19	[3.15, 4.05]
4	male	3.73	0.78	[3.44, 4.03]	3.50	1.28	[3.02, 3.98]
5*	male	3.77	1.14	[3.34, 4.19]	4.50	1.28	[4.02, 4.98]
6*	male	3.90	0.84	[3.58, 4.22]	4.13	1.01	[3.76, 4.51]
7*	male	4.03	0.93	[3.69, 4.38]	4.17	1.12	[3.75, 4.58]
8*	female	4.40	0.97	[4.04, 4.76]	3.27	0.98	[2.90, 3.63]
9*	female	4.27	0.94	[3.91, 4.62]	4.47	1.07	[4.07, 4.87]
10	female	4.00	0.95	[3.65, 4.35]	3.50	1.20	[3.05, 3.95]
11	female	3.80	0.85	[3.48, 4.12]	2.83	1.09	[2.43, 3.24]
12*	female	4.10	1.09	[3.69, 4.51]	4.03	1.19	[3.59, 4.48]
13*	female	4.10	1.03	[3.72, 4.48]	4.13	1.14	[3.71, 4.56]
14*	female	4.47	0.90	[4.13, 4.80]	4.20	0.89	[3.87, 4.53]

Photos marked with * were selected as stimuli for Study 2

Appendix B

Results of the Pilot Study 2 per photograph

Children photos							
		"Foreign" ratings			"Adult-like" ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1	male	2.87	1.82	[2.20, 3.54]	3.74	1.55	[3.17, 4.31]
2*	male	2.42	1.46	[1.89, 2.95]	2.52	1.34	[2.03, 3.01]
3	male	2.42	1.48	[1.88, 2.96]	2.00	1.21	[1.56, 2.44]
4*	male	3.19	1.87	[2.51, 3.88]	3.45	1.75	[2.81, 4.09]
5*	male	2.39	1.61	[1.80, 2.98]	3.29	1.74	[2.65, 3.93]
6*	female	2.87	1.57	[2.30, 3.45]	3.52	1.52	[2.96, 4.08]
7*	female	4.39	1.63	[3.79, 4.98]	3.77	1.78	[3.12, 4.43]
8	female	1.74	1.09	[1.34, 2.14]	3.45	1.63	[2.85, 4.05]
9*	female	2.16	1.32	[1.68, 2.65]	4.16	1.66	[3.55, 4.77]
10*	female	2.06	1.39	[1.56, 2.57]	2.90	1.49	[2.36, 3.45]
11*	male	3.58	1.54	[3.01, 4.15]	3.10	1.76	[2.45, 3.74]
12*	male	2.94	1.69	[2.31, 3.56]	2.60	1.59	[2.01, 3.19]
13*	female	4.06	1.77	[3.42, 4.71]	3.68	1.89	[2.99, 4.37]
14	female	2.81	1.85	[2.13, 3.49]	3.26	1.71	[2.63, 3.89]

Photos marked with * were used as stimuli in Study 2

Children photos							
		"Mean-face" ratings			"Devious" ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1	male	2.23	1.43	[1.70, 2.75]	2.32	1.25	[1.86, 2.78]
2*	male	2.84	1.29	[2.36, 3.31]	2.65	1.56	[2.07, 3.22]
3	male	2.16	1.46	[1.62, 2.70]	2.77	1.63	[2.18, 3.37]
4*	male	2.39	1.73	[1.75, 3.02]	1.65	0.88	[1.32, 1.97]
5*	male	2.68	1.78	[2.03, 3.33]	2.10	1.37	[1.59, 2.60]
6*	female	3.39	1.82	[2.72, 4.05]	3.26	1.81	[2.60, 3.92]
7*	female	4.35	1.78	[3.70, 5.01]	3.58	1.88	[2.89, 4.27]
8	female	2.61	1.89	[1.92, 3.31]	2.48	1.46	[1.95, 3.02]
9*	female	2.90	1.70	[2.28, 3.53]	3.29	1.74	[2.65, 3.93]
10*	female	2.29	1.40	[1.78, 2.80]	2.65	1.72	[2.01, 3.28]
11*	male	3.26	2.08	[2.49, 4.02]	2.29	1.37	[1.79, 2.79]
12*	male	1.97	1.43	[1.44, 2.49]	1.90	1.27	[1.44, 2.37]
13*	female	4.29	1.83	[3.62, 4.96]	3.55	1.79	[2.89, 4.20]
14	female	1.81	1.14	[1.39, 2.22]	3.13	1.80	[2.47, 3.79]

Photos marked with * were used as stimuli in Study 2

Adults photos

		"Foreign" ratings			"Adult-like" ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1*	male	4.35	1.82	[3.68, 5.02]	3.87	1.31	[3.39, 4.35]
2*	male	4.84	1.57	[4.26, 5.42]	3.65	1.28	[3.18, 4.11]
3	male	1.81	0.91	[1.47, 2.14]	4.90	1.49	[4.36, 5.45]
4	male	3.65	1.70	[3.02, 4.27]	4.29	1.44	[3.76, 4.82]
5*	male	2.26	1.50	[1.71, 2.81]	3.16	1.46	[2.62, 3.70]
6*	male	3.23	1.69	[2.61, 3.84]	3.13	1.41	[2.61, 3.65]
7*	male	2.29	1.40	[1.78, 2.80]	3.16	1.39	[2.65, 3.67]
8*	female	4.03	1.82	[3.37, 4.70]	5.97	0.95	[5.62, 6.32]
9*	female	3.97	1.62	[3.37, 4.56]	4.35	1.40	[3.84, 4.87]
10	female	4.35	1.74	[3.72, 4.99]	4.55	1.41	[4.03, 5.07]
11	female	2.35	1.28	[1.89, 2.82]	4.42	1.69	[3.80, 5.04]
12*	female	4.19	2.07	[3.43, 4.95]	4.26	1.18	[3.82, 4.69]
13*	female	2.84	1.19	[2.40, 3.27]	4.65	1.25	[4.19, 5.10]
14*	female	3.45	1.67	[2.84, 4.06]	5.45	0.99	[5.09, 5.82]

Photos marked with * were used as stimuli in Study 2

Adults photos

		"Mean-face" ratings			"Devious" ratings		
Photo	Gender	*M*	*SD*	95% CI	*M*	*SD*	95% CI
1*	male	2.81	1.49	[2.26, 3.35]	2.52	1.46	[1.98, 3.05]
2*	male	2.19	1.49	[1.65, 2.74]	2.45	1.61	[1.86, 3.04]
3	male	3.35	1.54	[2.79, 3.92]	3.32	1.60	[2.74, 3.91]
4	male	3.48	1.65	[2.88, 4.09]	2.94	1.57	[2.36, 3.51]
5*	male	2.00	1.26	[1.54, 2.46]	2.39	1.28	[1.92, 2.86]
6*	male	2.90	1.70	[2.28, 3.53]	3.10	1.58	[2.52, 3.68]
7*	male	1.65	0.80	[1.35, 1.94]	1.81	0.98	[1.45, 2.17]
8*	female	4.61	1.52	[4.06, 5.17]	3.94	1.86	[3.25, 4.62]
9*	female	2.45	1.63	[1.85, 3.05]	2.87	1.43	[2.35, 3.40]
10	female	4.06	1.53	[3.50, 4.62]	3.65	1.66	[3.03, 4.26]
11	female	4.29	1.74	[3.65, 4.93]	3.61	1.80	[2.95, 4.27]
12*	female	2.26	1.53	[1.70, 2.82]	2.35	1.20	[1.92, 2.79]
13*	female	2.48	1.23	[2.03, 2.94]	2.74	1.39	[2.23, 3.25]
14*	female	3.10	1.68	[2.48, 3.71]	3.52	2.01	[2.78, 4.26]

Photos marked with * were used as stimuli in Study 2